

SUNNYSIDE COAL MINE - HIGHWALL DRAIN

MODIFICATION REPORT



APRIL 2022  
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## 1 INTRODUCTION

This Modification Report has been prepared by Whitehaven Coal Limited (Whitehaven) for the Sunnyside Coal Mine (SCM) Highwall Drain Modification (the Modification).

The SCM was an open cut mine whilst in operation, located in the Gunnedah Basin of New South Wales (NSW) approximately 15 kilometres(km) west of Gunnedah (Figure 1-1). In November 2019 coal extraction ceased at the SCM and mine closure activities commenced.

The SCM is owned by Namoi Mining Pty Limited (NMPL), a wholly owned subsidiary of Whitehaven. NMPL is the applicant for the Modification.

### 1.1 APPROVALS HISTORY

Project Approval (PA) 06\_0308 for the SCM was granted under Part 3A of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) in 2008 and has been modified on three occasions. The most recent modification was approved in January 2019 and authorises a free-draining final landform with a final depression rather than a final void.

### 1.2 OVERVIEW OF THE SUNNYSIDE COAL MINE

The SCM was approved to extract up to 1 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal until November 2020 with ROM coal transported by truck to the Whitehaven Coal Handling and Preparation Plant (CHPP) near Gunnedah (Figure 1-1).

The SCM commenced mining operations in 2008 and, after a period of care and maintenance between 2013 and 2017, continued operating until November 2019 when coal extraction ceased and decommissioning and rehabilitation activities commenced. Decommissioning and rehabilitation has been largely completed across the site during mine closure following the cessation of coal extraction in 2019.

The *Sunnyside Coal Mine Closure Mining Operations Plan* (MOP) (Whitehaven, 2018b) authorises decommissioning and rehabilitation activities to be carried out until November 2025.

The MOP provides for progressive decommissioning and rehabilitation of mine infrastructure including the ROM coal stockpile, on-site primary crushing facility, conveyor, coal load-out bin, and ancillary facilities including offices and a workshop.

Closure and rehabilitation activities are being implemented in accordance with the approved final landform of the SCM, which comprises of:

- an out-of-pit waste rock emplacement with maximum elevation of approximately 345 metres (m) Australian Height Datum (AHD) following partial backfilling of the open cut;
- the free-draining final depression with a minimum elevation of approximately 330 m AHD following partial backfilling; and
- a highwall in the south-western portion of the site.

The approved SCM final landform, approximate disturbance extent, and Mining Lease (ML) is shown on Figure 1-2.

The Project Boundary and the real property descriptions associated with the SCM are included in PA 06\_0308.

#### 1.2.1 Environmental Monitoring and Management

Whitehaven prepares and implements various environmental plans and, strategies in accordance with the requirements of PA 06\_0308. The following plans are considered relevant to the Modification and are discussed further in Section 6:

- *Sunnyside Coal Mine Koala Management Plan* (Koala Management Plan) (Whitehaven, 2017a)
- *Sunnyside Coal Mine Aboriginal Cultural Heritage Management Plan* (ACHMP) (Whitehaven, 2017b).
- *Sunnyside Coal Mine Water Management Plan* (WMP) (Whitehaven, 2018a).

### 1.3 OVERVIEW OF THE MODIFICATION

The approved SCM final landform includes a section of highwall on the southern side of the final depression (Figure 1-2). Sunnyside Hill is the wooded area south of the highwall and outside of the SCM disturbance footprint (Figure 1-2).



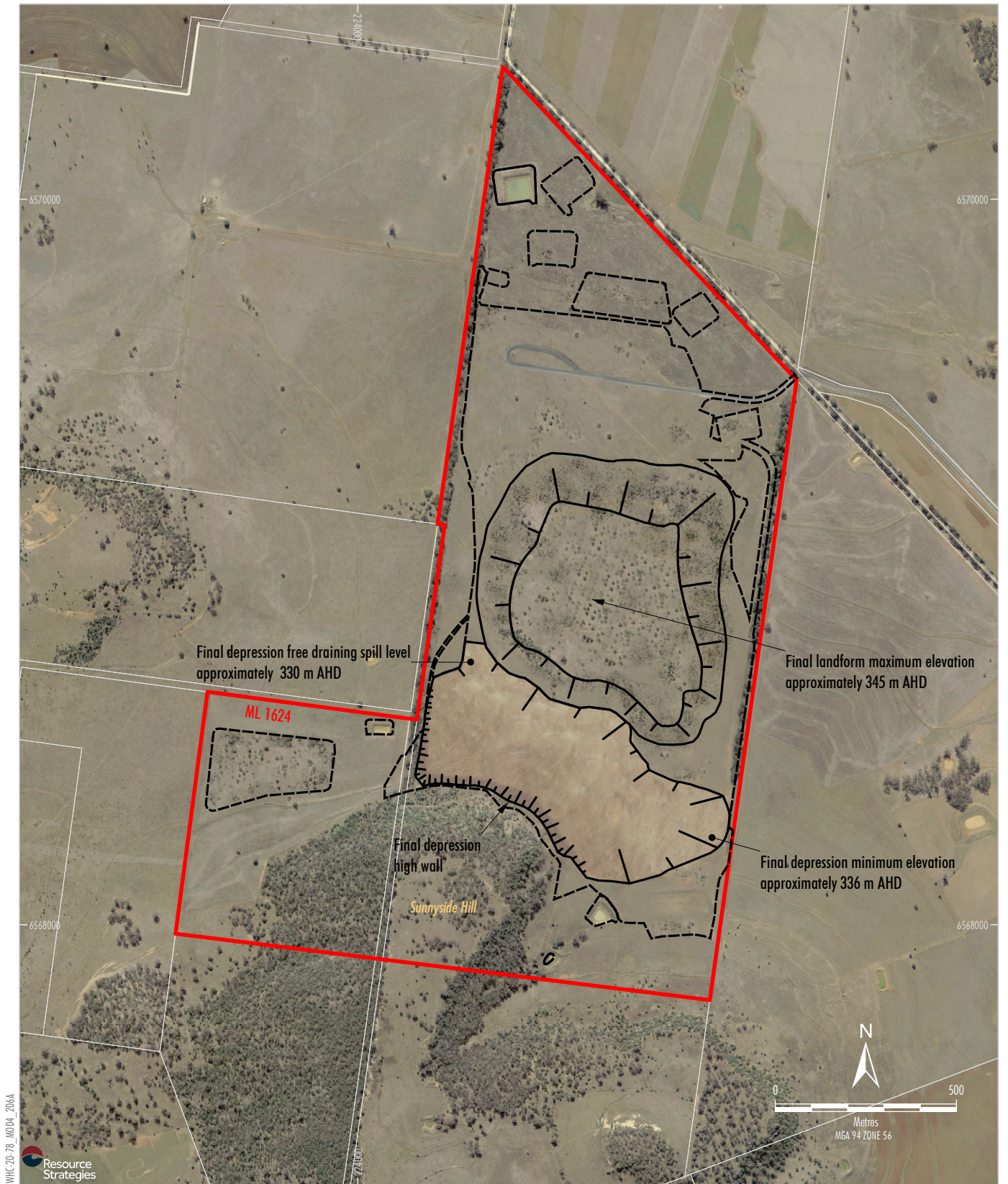
WHC-20-78\_M004\_2018  
 Resource Strategies

- LEGEND**
- Mine Site
  - Mining Lease Boundary
  - Local Government Boundary
  - State Forest
  - State Conservation Area, Aboriginal Area

Source: Geoscience Australia (2011);  
 NSW Spatial Services (2020)

**WHITEHAVEN COAL**  
**SUNNYSIDE COAL MINE**  
 Regional Location

**Figure 1-1**



WHC-20-78 /MO/DA\_206A



- LEGEND**
- Mining Lease Boundary
  - Approved Extent of Disturbance

Source: The State of NSW (2020); Whitehaven Coal (2020).  
 Orthophoto: Whitehaven Coal (May 2018, July 2011).

**Figure 1-2**

Surface water from Sunnyside Hill drains north toward the highwall. During heavy rainfall, surface water runoff can report to the highwall which poses an erosion risk to the highwall face.

To protect the highwall against erosion a diversion drain is proposed to be constructed along the top of the highwall. The drain would collect and convey surface water runoff from Sunnyside Hill to two existing small gullies either side of the highwall. Figure 1-3 shows the proposed drain footprint and arrangement.

The highwall diversion drain would be located wholly within ML 1624.

A small area (0.15 hectares [ha]) of additional land disturbance outside of the approved disturbance extent is required to construct the highwall diversion drain (Figure 1-3).

To compensate for this additional disturbance and achieve an overall net reduction in land approved for disturbance, Whitehaven proposes to relinquish 0.32 ha of land that is currently approved for disturbance (i.e. within the approved extent of disturbance) but not required to be disturbed for the SCM. The proposed relinquishment area is shown in Figure 1-3.

Accordingly, this Modification seeks approval to adjust the SCM disturbance boundary to allow for the construction of a highwall diversion drain without increasing impacts on biodiversity.

The Modification would not change any other aspect of the closure and rehabilitation of SCM.

An assessment of the biodiversity values in the additional disturbance area and relinquishment area was undertaken by AMBS Ecology & Heritage (AMBS) (Attachment A). In accordance with section 7.17(2)(c) of the NSW *Biodiversity Conservation Act 2016* (BC Act), the assessment concludes that the Modification would not increase impacts on biodiversity values.

Accordingly, approval for the Modification is sought under section 4.55(1A) of the EP&A Act.

A detailed description of the Modification is provided in Section 3.

### 1.3.1 Alternatives Considered

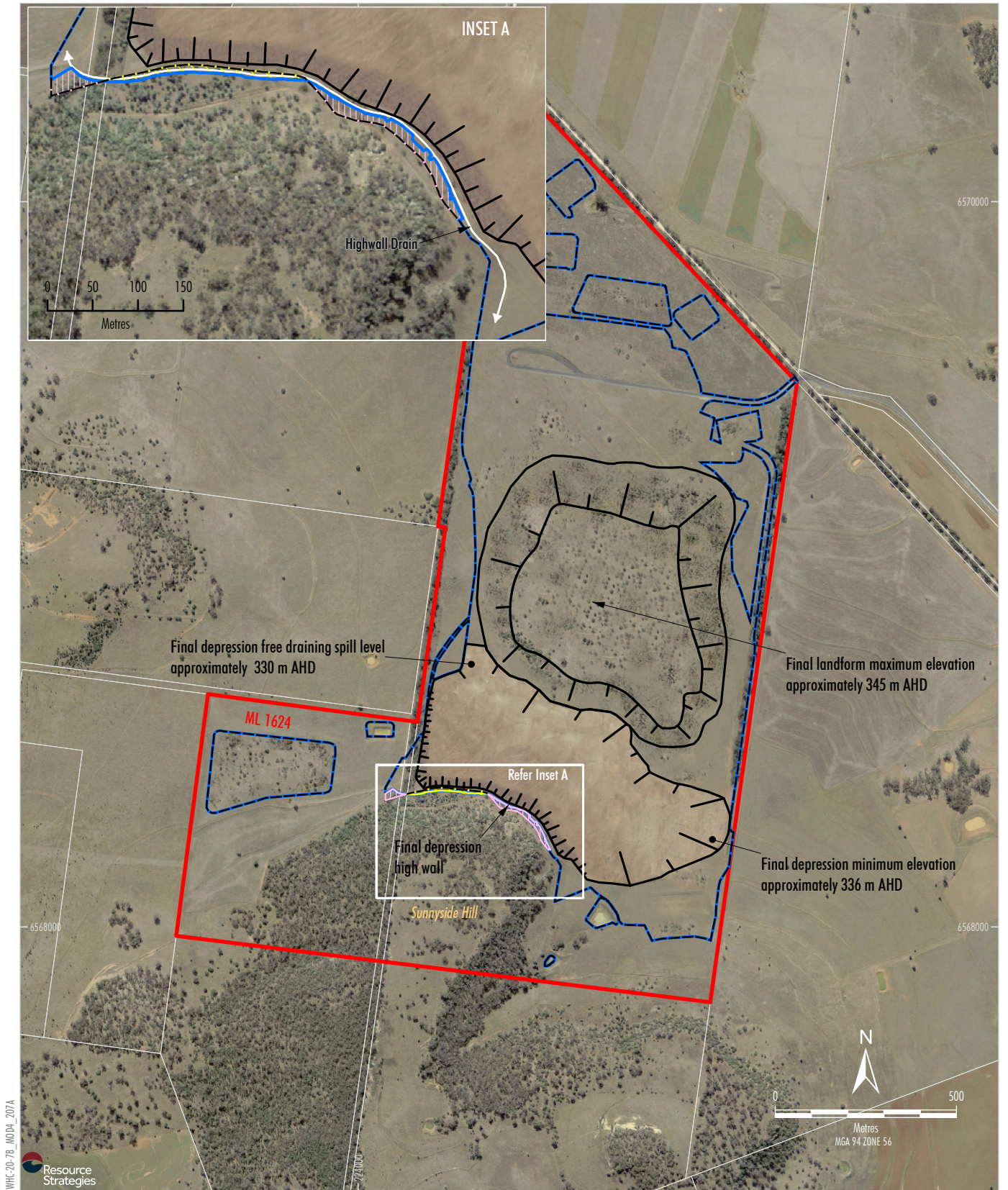
Without the proposed highwall drain, the long-term stability of the highwall would continue to be compromised from erosion caused by runoff from Sunnyside Hill.

Whitehaven considers that no alternative approaches exist to resolving the current drainage and erosion issue. The diversion drain has been designed to reduce the amount of land disturbance required as much as possible.

## 1.4 REPORT CONTENT

This Modification Report includes the following:

Section 1	Provides a brief description of the approved SCM and the Modification.
Section 2	Identifies the strategic context for the Modification.
Section 3	Provides a detailed description of the Modification.
Section 4	Identifies the key relevant statutory requirements for the Modification.
Section 5	Describes the stakeholder consultation undertaken for the Modification.
Section 6	Describes the existing environment, assesses the potential environmental impacts associated with the Modification, and describes the potential measures to avoid, mitigate, rehabilitate/remediate, monitor and/or offset the potential impacts of the Modification.
Section 7	Evaluates the merits of the Modification.
Section 8	Lists the references cited in this document.
Attachment 1	Detailed Statutory Compliance Reconciliation Table
Appendix A	<i>Sunnyside Coal Mine Highwall Drain Modification Biodiversity Assessment</i> (AMBS, 2022)



- LEGEND**
- Mining Lease Boundary
  - Approved Extent of Disturbance
  - Additional Disturbance
  - Disturbance Not Required
  - Modified Extent of Disturbance
  - Highwall Drain

Source: The State of NSW (2020); Whitehaven Coal (2020).  
 Orthophoto: Whitehaven Coal (May 2018, July 2011).

**Figure 1-3**

## 2 STRATEGIC CONTEXT

The Modification would provide for the ongoing safe and efficient closure and rehabilitation of the SCM in accordance with the relevant State approval conditions.

The Modification is of strategic importance to Whitehaven as it would improve rehabilitation outcomes at the SCM. The Modification is considered to directly contribute to meeting State approval conditions related to rehabilitation and closure of the SCM including Schedule 3, Condition 29 of PA 06\_0308 which requires the mine site to be “safe, stable and non-polluting”, with a final landform that “maximises geotechnical performance, stability and hydrological function”.

Biodiversity values in the additional disturbance area and relinquishment area were assessed by AMBS (Appendix A). In accordance with section 7.17(2)(c) of the BC Act, it was concluded that the Modification would not increase impacts on biodiversity values. In fact, there would be a net reduction in land approved for disturbance at the SCM with the relinquishment of 0.32 ha that is currently approved for disturbance but not required to be disturbed.

The Modification can be implemented in accordance with all existing environmental limits and performance measures for the SCM.

## 3 DESCRIPTION OF MODIFICATION

### 3.1 BACKGROUND

The SCM final landform is in the final stages of being rehabilitated to achieve the following rehabilitation objectives (Table 10 of Condition 29, PA 06\_0308):

- Safe, stable and non-polluting.
- Final landforms maximise geotechnical performance, stability and hydrological function.
- Constructed landforms maximise surface water drainage to the natural environment.
- Minimise visual impact of final landforms as far as is reasonable and feasible.
- No final void and free-draining to the natural drainage system.

Surface water runoff from Sunnyside Hill can overtop the highwall in large rainfall events which poses an erosion risk to the highwall face. To protect the highwall and rehabilitated areas against erosion (and therefore meet the rehabilitation objectives described above) a diversion drain is proposed to be constructed along the top of the highwall (Figure 1-3).

### 3.2 PROPOSED HIGHWALL DRAIN

The earthen diversion drain would collect upslope surface water runoff (i.e., water that has not come into contact with coal mining activities) from Sunnyside Hill and convey to two small gullies either side of the highwall. The drain footprint is shown in Figure 1-3. Runoff conveyed by the drain would flow to the downstream receiving environment and remain within the same water source (i.e. the Bluevale water source within the *Water Sharing Plan for the Namoi and Peel Unregulated Rivers Water Sources 2012*).

The earthen drain would be approximately 660 m long and have an average width of 5 m. Actual width would vary along the drain length due to local topography.

The diversion drain would be revegetated and rock protection would be used in erodible areas, as required. Native trees would be used in appropriate locations (i.e. adjacent to the drain).

The highwall diversion drain would be located wholly within ML 1624. A small area 0.15 ha of additional land disturbance outside of the approved disturbance extent is required to construct the highwall diversion drain (Figure 1-3). Whitehaven proposes to relinquish a 0.32 ha area of land that is approved for disturbance (i.e., within the approved extent of disturbance) but not required to be disturbed for the SCM project to achieve an overall net reduction in disturbance (Figure 1-3).

Biodiversity values in the additional disturbance area and the relinquishment area have been assessed by AMBS (Appendix A, Section 6).

### 3.3 CONSTRUCTION METHOD

Construction of the diversion drain would be undertaken using an excavator, dozer, compactor, and water cart; all of which are part of the existing mine rehabilitation fleet. No additional construction equipment would be required to construct the drain.

Construction would occur from 7am to 10pm Monday to Saturday and 7am to 6pm on Saturdays, but not on Sundays or public holidays, as per the approved mine operating hours in PA 06\_0308.

The construction site would be accessed from east and west of the diversion drain footprint via the existing highwall access road. No additional disturbance is required for construction access purposes.

### 3.4 SUMMARY

This Modification seeks approval to adjust the SCM disturbance boundary to allow for the construction of a highwall diversion drain without increasing impacts on biodiversity.

Approval for the Modification is sought under section 4.55(1A) of the EP&A Act.

The Modification would not change any other aspect of the SCM closure and rehabilitation.

A comparison between the approved SCM and the Modification is provided in Table 3-1.

**Table 3-1**  
**Comparison of the Approved SCM and the Modification**

Aspect	Approved SCM	The Modification
Project Life	Mining operations approved until the end of 2020.	No change.
ML	Mining operations within ML 1624.	No change.
Disturbance Area	Total disturbance area of approximately 163 ha.	Disturbance extent adjusted to allow construction of the highwall drain with overall 0.17 ha reduction in disturbance.
Mining Method	Mining using open cut and augering methods.	No change.
Coal Reserves	Extraction of coal from the Hoskissons Coal Seam.	No change.
Annual Coal Production	Production of up to 1 Mtpa of ROM coal.	No change.
Total Coal Production	Mineable reserve of 5.9 million tonnes over the life of the SCM.	No change.
Out-of-pit Waste Rock Emplacement	Out-of-pit waste rock emplacement with a maximum elevation of approximately 352 m AHD during operations. Reduction in the maximum elevation of the existing waste rock emplacement to 345 m AHD post-mining.	No change.
Final Depression	Development of a free-draining final depression with a minimum elevation of approximately 330 m AHD (following partial backfill). Retention of the existing highwall in the southern portion of the open cut.	No change.
Coal Processing	ROM coal crushed and stockpiled on-site.	No change.
On-site Infrastructure	On-site infrastructure including: <ul style="list-style-type: none"> <li>■ mine entrance and internal access roads;</li> <li>■ a coal crushing facility, conveyor and coal load out bin;</li> <li>■ ROM coal stockpile;</li> <li>■ water management structures, including two storage facilities;</li> <li>■ amenity bunds near the processing area and along the eastern boundary of the mining area; and</li> <li>■ ancillary surface facilities including offices and workshop.</li> </ul>	No change.
Hours of Operation	Mining operations between 7.00 am to 10.00 pm, Monday to Friday and 7.00 am to 6.00 pm on Saturdays. No operations on Sundays or Public Holidays.	No change.
Mining Fleet	Mining fleet including excavators, scrapers, dozers, haul trucks, drills, and water trucks.	No change.
Coal Transport	Product coal would be loaded onto trucks (up to 125 laden trucks per day) and transported to the Whitehaven CHPP.	No change.
Coal Haulage Route	Coal transported along public roads (including realigned Coocooboona Lane) on the approved coal haulage route.	No change.
Coal Transport Hours	Coal transport on the coal haulage route between 7.00 am to 6.00 pm Monday to Friday (or between 7.00 am to 8.00 pm during daylight savings time) and between 7.00 am to 4.00 pm on Saturdays. No coal transport on Sundays or public holidays. No coal transport during AgQuip Field Days.	No change.
Water Demand and Supply	Annual water demand between 75 to 100 megalitres per year (up to 0.3 megalitres per day), mainly for dust suppression. Water sourced from pit inflows surface run-off captured by the on-site water storage. No external water supply requirements.	No change.

## 4 STATUTORY CONTEXT

This section outlines the statutory requirements relevant to the assessment of the Modification.

In accordance with the guideline *Preparing a Modification Report* (DPIE, 2021), Attachment 1 provides a detailed statutory compliance table that identifies all the relevant statutory requirements for the Modification.

### 4.1 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

The EP&A Act and the NSW *Environmental Planning and Assessment Regulation 2021* (EP&A Regulation) set the framework for planning and environmental assessment in NSW.

#### 4.1.1 Assessment Pathway

The SCM is considered to be a State Significant Development (SSD) for the purposes of the EP&A Act. Approval for the Modification is sought under section 4.55(1A) of the EP&A Act which states:

***Modifications involving minimal environmental impact***

*A consent authority may, on application being made by the applicant or any other person entitled to act on a consent granted by the consent authority and subject to and in accordance with the regulations, modify the consent if—*

- (a) *it is satisfied that the proposed modification is of minimal environmental impact, and*
- (b) *it is satisfied that the development to which the consent as modified relates is substantially the same development as the development for which the consent was originally granted and before that consent as originally granted was modified (if at all), and*
- (c) *it has notified the application in accordance with—*
  - (i) *the regulations, if the regulations so require, or*
  - ...
- (d) *it has considered any submissions made concerning the proposed modification within any period prescribed by the regulations...*

With respect to section 4.55(1A)(a), Whitehaven considers the Modification to be of minimal environmental impact as described in Section 6.

With respect to section 4.55(1A)(b), clause 3BA(6) in Schedule 2 to the *Environmental Planning and Assessment (Savings, Transitional and Other Provisions) Regulation 2017* operates such that the consent authority must only be satisfied that the proposed modified development is substantially the same as the development approved by the most recent modification of PA 10\_0138 under section 75W of the EP&A Act (i.e. Modification 3).

Based on the information contained in this Modification Report, the consent authority can be satisfied that the SCM incorporating the Modification would remain substantially the same as the development authorised by PA 10\_0138 as last modified by Modification 3.

#### 4.1.2 NSW Environmental Planning and Assessment Act 1979 Objects

The objects stated in section 1.3 of the EP&A Act are to promote and facilitate social and economic welfare of the community, and a better environment through proper management, development and conservation of the State's natural resources, and sustainable management of built and cultural heritage (Attachment 1).

The Modification is considered to be generally consistent with the objects of the EP&A Act, as it would:

- facilitate ecological sustainable development (ESD) by allowing rehabilitation objectives for the SCM final landform to be achieved;
- result in an overall minor reduction in surface disturbance for the SCM; and
- would be developed in a manner that incorporates community engagement, with a range of stakeholders consulted during the preparation of this Modification Report (Section 5).

#### 4.1.3 Evaluation under Section 4.15(2) of the EP&A Act

Section 4.55(3) of the EP&A Act states:

*In determining an application for modification of a consent under this section, the consent authority must take into consideration such of the matters referred to in section 4.15(1) as are of relevance to the development the subject of the application. The consent authority must also take into consideration the reasons given by the consent authority for the grant of the consent that is sought to be modified.*

Table 4-1 provides details of the consideration of relevant matters in section 4.15(1) of the EP&A Act for the Modification.

Detailed consideration of the EP&A Regulation is provided in Attachment 1.

The consent authority can be satisfied of the relevant matters in the EP&A Act and EP&A Regulation.

**Table 4-1**  
**Relevant Considerations of section 4.15(1) of the EP&A Act**

Relevant Matters in section 4.15(1) of the EP&A Act	Response Summary
<p><b>Matters for consideration—general</b></p> <p><i>In determining a development application, a consent authority is to take into consideration such of the following matters as are of relevance to the development the subject of the development application—</i></p> <p>(a) <i>the provisions of—</i></p> <p>(i) <i>any environmental planning instrument, and</i></p> <p>...</p>	<p>State Environmental Planning Policies (SEPPs) of potential relevance to the Modification are considered in Attachment 1.</p> <p>The SCM is within the Gunnedah Shire Council Local Government Area (LGA), for which the <i>Gunnedah Local Environmental Plan</i> (Gunnedah LEP) is relevant (Attachment 1).</p>
<p>(iii) <i>any development control plan, and</i></p>	<p>Development control plans do not apply to SSD.</p>
<p>(iiia) <i>any planning agreement that has been entered into under section 7.4, or any draft planning agreement that a developer has offered to enter into under section 7.4, and</i></p>	<p>The Modification does not impact on the agreement with Gunnedah Shire Council established under Condition 37 of PA 10_0138 which would continue to apply for the development as proposed to be modified.</p>
<p>(iv) <i>the regulations (to the extent that they prescribe matters for the purposes of this paragraph),</i></p> <p>...</p> <p><i>that apply to the land to which the development application relates,</i></p>	<p>Relevant provisions of the EP&amp;A Regulation are considered in Attachment 1.</p>
<p>(b) <i>the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality,</i></p>	<p>Whitehaven considers the Modification to be of minimal environmental impact for the reasons outlined in Section 6 of this report.</p>
<p>(c) <i>the suitability of the site for the development,</i></p> <p>...</p>	<p>The Modification can be implemented in accordance with the existing environmental limits and performance measures for the SCM, and with no net increase in the disturbance footprint.</p>
<p>(e) <i>the public interest.</i></p>	<p>The Modification would provide for the ongoing safe and efficient closure and rehabilitation of the SCM in accordance with the relevant State approval conditions.</p>

## 4.2 OTHER NSW LEGISLATION

In addition to the EP&A Act, the following other NSW legislation is potentially relevant to the Modification:

- *Biodiversity Conservation Act 2016* (BC Act);
- *Protection of the Environment Operations Act* (PoEO Act);
- *Water Management Act* (WM Act);
- *Mining Act 1992* (Mining Act); and
- *National Parks and Wildlife Act 1974*.

NMPL would continue to obtain the necessary licences and approvals under these Acts as required, including revisions to relevant plans, licences or agreements to incorporate the Modification.

Additional detail on the likely requirements of the Modification under the key Acts is provided in the following subsections.

### 4.2.1 Biodiversity Conservation Act 2016

The Biodiversity Conservation Act 2016 (BC Act) provides the approach to be followed for conducting an assessment of a development's impacts on threatened species and ecological communities.

Under the *Biodiversity Conservation (Savings and Transitional) Regulation, 2017*, a biodiversity development assessment report is not required to be submitted for the Modification if the authority or person determining the application for modification (or determining the environmental assessment requirements for the application) is satisfied that the modification will not increase the impact on biodiversity values.

A Biodiversity Assessment has been prepared by AMBS for the Modification and is provided in Appendix A. In accordance with section 7.17(2)(c) of the BC Act, the assessment concludes that the Modification would not increase impacts on biodiversity values. In fact, there would be a net reduction in land approved for disturbance at the SCM with the relinquishment of 0.32 ha that is currently approved for disturbance but not required to be disturbed.

Accordingly, with reference to section 7.17(2)(c) of the BC Act and the *Threatened Species Test of Significance Guidelines* (State of NSW and Office of Environment and Heritage, 2018), no biodiversity development assessment report is required for the Modification as the Modification would not increase impacts on biodiversity values.

### 4.2.2 Mining Act 1992

The Mining Act regulates environmental protection and rehabilitation of all MLs, including the requirement for the submission of a MOP. The SCM Closure MOP includes a description of the highwall diversion drain and therefore is not expected to require updating to incorporate the Modification (if approved).

The Modification would be wholly within existing MLs (ML 1624) and therefore no amendment of the existing authority or issue of new authorities is required under the Mining Act.

Section 380AA(1) of the Mining Act relevantly states:

- (1) *An application for development consent, or for the modification of a development consent, to mine for coal cannot be made or determined unless (at the time it is made or determined) the applicant is the holder of an authority that is in force in respect of coal and the land where mining for coal is proposed to be carried out, or the applicant has the written consent of the holder of such an authority to make the application.*

Section 380AA(1) of the Mining Act is considered to be satisfied given the current registered holder of the SCM mining tenement, being NMPL, is a wholly owned subsidiary of Whitehaven.

### 4.2.3 National Parks and Wildlife Act 1974

The NSW *National Parks and Wildlife 1974* (NPW Act) contains provisions for the protection and management of national parks, historic sites, nature reserves and Aboriginal heritage in NSW. Division 2 of Part 6 of the NPW Act provides for Aboriginal Heritage Impact Permits (AHIPs).

In accordance with section 4.41 of the EP&A Act, AHIPs are not required for projects classified as SSD and approved under Part 4 of the EP&A Act. Therefore, an AHIP has not been obtained for the SCM.

Impacts to Aboriginal heritage values associated with the SCM are managed under the approved ACHMP required under Condition 3(33) of PA 06\_0308.

The Modification area does not contain any known Aboriginal heritage sites identified in *Archaeological Surveys & Reports Pty Ltd* (ASR) (ASR, 2007). The nearest known Aboriginal heritage site is approximately 400 m away from the Modification area (ASR, 2007).

Whitehaven would continue to apply relevant management measures in the approved ACHMP for the Modification, should any unknown Aboriginal cultural heritage sites be encountered during construction activities for the Modification.

#### **4.2.4 Protection of the Environment Operations Act 1997**

Environment Protection Licence (EPL) 12957 authorises "mining for coal" and "coal works" for the purpose of the *NSW Protection of the Environment Operations Act 1997*. NMPL would continue to carry out the development in accordance with EPL 12957, and a variation of EPL 12957 is not expected to be necessary for the Modification.

#### **4.2.5 Water Management Act 2000**

The WM Act regulates the licensing, allocation, capture and use of water resources. Under the WM Act, water sharing plans establish rules for sharing water between different users and between the various rivers or aquifers.

The SCM is located within the Bluevale water source within the *Water Sharing Plan for the Namoi and Peel Unregulated Rivers Water Sources 2012*.

The Modification involves construction of a diversion drain to divert upslope surface water runoff (i.e., water that has not come into contact with coal mining activities) from Sunnyside Hill. Runoff conveyed by the drain would flow to the downstream receiving environment and remain within the same water source.

Water passing through the diversion drain would not be utilised (i.e. taken) by the SCM. Therefore, no additional water licencing is considered to be required for the Modification.

The diversion drain would not involve land disturbance within 40 m of a waterway as defined by the *NSW Water Management (General) Regulation 2018* (i.e. the NSW Government hydroline dataset).

Overall, the Modification would not change the existing water management system or water demand and supply arrangements. Accordingly, the SCM surface water management system would continue to be operated in accordance with the applicable requirements of the WM Act, EPL 12957 and the WMP.

### **4.3 ENVIRONMENTAL PLANNING INSTRUMENTS**

Detail on potential Modification requirements under the key environmental planning instruments of relevance to the SCM incorporating the Modification is included in the statutory compliance table provided in Attachment 1.

### **4.4 ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999**

A Biodiversity Assessment has been prepared by AMBS for the Modification and is provided in Appendix A.

The assessment considered the potential impact of the highwall diversion drain on relevant Matters of National Environmental Significance (MNES) as required under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The assessment concludes that the proposed Modification would not increase impacts on the biodiversity values of the subject site and does not contain important habitat values for threatened or endangered species (Appendix A).

The very small area (0.09 ha) of wooded habitat to be cleared at the edge of a more extensive treed (including adjacent to the subject site) habitat and the developed landscape matrix will have negligible impacts on any biota or habitat assessed under MNES (Appendix A).

## 5 ENGAGEMENT

Whitehaven consults with relevant State government agencies and local government on a regular basis in relation to its Gunnedah Coalfield mining operations.

Whitehaven consulted with NSW Government agencies and the SCM Community Consultative Committee (CCC) during the preparation of this Modification in consideration of the *Undertaking Engagement Guidelines for State Significant Projects* DPIE, 2021a. A summary of this consultation is provided below.

It is anticipated that Whitehaven would continue consulting with NSW Government agencies and the CCC throughout the application assessment process.

### 5.1 NSW GOVERNMENT AGENCIES

#### 5.1.1 Department of Planning & Environment

Whitehaven provided an overview of the Modification, scope of environmental assessments, proposed assessment pathway, and proposed consultation to the DPE in February 2022.

Whitehaven sent a scoping letter to DPE in March 2022 which was progressed through the NSW Major Projects Portal.

#### 5.1.2 NSW Resource Regulator

Whitehaven provided a summary via email of the Modification to the NSW Resource Regulator in April 2022.

#### 5.1.3 Biodiversity Conservation & Science Division of DPE

Whitehaven provided an overview of the Modification and scope of the biodiversity assessment by AMBS in March 2022. BCS representatives requested the following information to be provide with this Modification Application (Appendix A and Section 6):

- the Modification Application is to demonstrate that no loss in biodiversity will occur; and
- a like-for-like comparison is required for the additional disturbance area and relinquishment area.

### 5.2 GUNNEDAH SHIRE COUNCIL

Whitehaven provided an overview of the Modification to the Gunnedah Shire Council in April 2022. The Gunnedah Shire Council did not raise any material issues related to the Modification.

### 5.3 LOCAL COMMUNITY

The SCM CCC was established in accordance with PA 06\_0308 to provide a mechanism for ongoing communication between Whitehaven and the local community. Membership of the CCC includes representatives of the local community, the Gunnedah Shire Council, and Whitehaven. Meetings are held generally half-yearly throughout the SCM closure and rehabilitation phase.

Whitehaven provided an overview of the Modification to the members of the CCC in March 2022.

## 6 ASSESSMENT OF IMPACTS

### 6.1 BIODIVERSITY

#### 6.1.1 Existing Environment

A Fauna Survey and Assessment was undertaken for the SCM by Kevin Mills & Associates (KMA) (2008). No threatened fauna species were recorded within the approved SCM disturbance area, however threatened fauna species were found in the surrounds.

Threatened species recorded by KMA (2008) included the Koala (*Phascolarctos cinereus*), Speckled Warbler (*Chthonicola saggittata*) and Grey-crowned Babbler (*Pomatostomus temporalis*), all listed as 'vulnerable' under the BC Act. The Koala is also listed as 'vulnerable' under the EPBC Act.

Two other threatened species recorded by KMA (2008), the Little Lorikeet (*Glossopsitta pusilla*) and Little Eagle (*Hieraaetus morphnoides*), were not listed at the time.

A Flora Assessment was undertaken by Geoff Cunningham Natural Resource Consultants Pty Ltd (Cunningham, 2007). No threatened flora species were recorded within the approved SCM disturbance area.

Cunningham (2007) mapped the patches of wooded areas and disturbed grasslands on Sunnyside Hill and adjacent to the highwall as:

- "Cleared Cropland and Pastureland"; and
- "Atalaya hemiglauca (Whitewood) Community".

Well vegetated woody habitats occur upslope of the highwall (on Sunnyside Hill) and to the south of the proposed highwall diversion drain footprint. A range of other plant communities were mapped by Cunningham (2007) in this area (e.g., "Dry Scrub Community of the Rocky Scarp").

#### 6.1.2 Existing Management

Between the subject site and upslope vegetated areas, a Koala-proof fence was installed prior to the commencement of mining operations as recommended in the initial Koala Management Plan (KMA, 2007). In accordance with Schedule 3, Condition 28 of PA 06\_0308 a Koala Management Plan was prepared for the Whitehaven CHPP.

It is noted that a portion of the areas shown as "proposed new vegetation to create Koala corridors using Koala feed trees" and "proposed enrichment planting adjacent to existing vegetation corridors" would be affected by the proposed highwall diversion drain. This would be addressed in a revision of the Koala Management Plan.

#### 6.1.3 Potential Impacts

Potential impacts on biodiversity values due to the Modification are assessed in the *Sunnyside Coal Mine Highwall Drain Modification Biodiversity Assessment* prepared by AMBS (Appendix A).

The assessment considered whether the Modification would increase impacts on biodiversity values identified in the BC Act and the NSW *Biodiversity Conservation Regulation 2017* (BC Regulation).

#### Methodology

AMBS considered the biodiversity values within the additional disturbance area and the area to be relinquished (Figure 1-3).

The following work scope and methodology was followed by AMBS in preparing the Biodiversity Assessment (Appendix A):

- Identification of Plant Community Types.
- Collection of vegetation integrity plot data as per the Biodiversity Assessment Method (BAM) (DPIE, 2020a) on the additional disturbance area and the area to be relinquished (applying the minimum plot requirements on each study area individually).
- Calculation of the vegetation integrity score using the BAM Calculator.
- Comparison of the threatened species known or likely to occur in the additional disturbance area and area to be relinquished.
- Preparation of an assessment of potential impacts on selected biodiversity values in the BC Act and BC Regulation.

In addition, AMBS considered the likelihood of significant impacts on MNES under the EPBC Act.

AMBS also considered relevant requirements of the *State Environmental Planning Policy (Biodiversity and Conservation) 2027*.

Further details are provided in Appendix A.

### **Impacts on Biodiversity Values**

In accordance with section 7.17(2)(c) of the BC Act, the assessment concludes that the Modification would not increase impacts on biodiversity values. In fact, there would be a net reduction in land approved for disturbance at the SCM with the relinquishment of 0.32 ha that is currently approved for disturbance but not required to be disturbed.

The AMBS biodiversity assessment found that the additional disturbance area includes 0.09 ha of disturbed plant community type (PCT) 147 and 0.06 ha of grassland and forbs dominated by exotic species. The relinquishment area contains 0.08 ha of PCT 147 and 0.24 ha of grassland and forbs dominated by exotic species.

The relinquishment area vegetation community (PCT 147) has a higher Vegetation Integrity Score of 40.1, generated by BAM-C, in comparison to the additional disturbance area vegetation community (32.6). The relinquishment area vegetation community also has a higher condition class compared to the additional disturbance area (Appendix A).

AMBS concluded that the overall vegetation integrity score for both areas were similar; however, the highest vegetation integrity scores and greatest habitat values were contained in the relinquishment area and will therefore be protected as a result of the Modification.

### **Matters of National Environmental Significance**

AMBS concluded that the very small area (0.09 ha) of wooded habitat to be cleared at the edge of a more extensive treed (including adjacent to the subject site) habitat and the developed landscape matrix will have negligible impacts on any biota or habitat assessed under MNES.

### **Koala Habitat**

AMBS concluded that the subject site does not have any trees that are recognised as Koala use trees listed in the Biodiversity and Conservation SEPP and is not core Koala habitat. The subject site does not include any trees in the expanded list of Schedule 2 Koala use species in the Biodiversity and Conservation SEPP.

The Koala Management Plan includes the subject site and will protect 112 ha of extant Koala habitat but also improve landscape connectivity by planting Koala food trees on the western and eastern boundaries of the Sunnyside Mine property.

## **6.2 ABORIGINAL CULTURAL HERITAGE**

### **6.2.1 Existing Environment**

An Aboriginal Heritage Assessment was undertaken for the SCM by ASR (2007).

Four Aboriginal heritage sites were recorded during the field survey, including an axe-grinding groove, an artefact scatter and two isolated artefacts. All of these sites were assessed as being of low significance in the Aboriginal Heritage Assessment (ASR, 2007).

All four of the Aboriginal heritage sites are located outside of the Modification area, with the closest site (AGG1) located approximately 400m away.

### **6.2.2 Existing Management**

In accordance with Schedule 3, Condition 33 of PA 06\_0308, a ACHMP was prepared for the SCM.

The ACHMP includes a protocol for the ongoing consultation and involvement of Aboriginal communities in the conservation and management of Aboriginal heritage on the SCM, and describes the measures that would be implemented to protect Aboriginal sites on site or any new Aboriginal sites discovered during the SCM.

### **6.2.3 Mitigation Measures, Management and Monitoring**

Any previously unrecorded Aboriginal heritage sites identified during works associated with the Modification would continue to be managed in accordance with the ACHMP.

## **6.3 OTHER ENVIRONMENTAL ASPECTS**

### **6.3.1 Visual Amenity**

The visual amenities of the approved landform were assessed previously in Modification 3. The Modification 3 assessment included consideration of the final landform highwall. The proposed drain would not be visible from the locations assessed previously. As the Modification is not considered to change the level of landscape modification, there will be no change to visual impacts.

### **6.3.2 Noise**

The highwall diversion drain would be constructed with the existing rehabilitation fleet described in Section 3.3 during the standard operational hours. No changes to noise impacts are expected. The approved Noise Management Plan developed in accordance with Schedule 3, Condition 9A of PA 06\_0308 would continue to apply for the Modification.

### **6.3.3 Air Quality**

Construction of the highwall diversion drain will be monitored the approved SCM Air Quality Management Plan.

## 7 EVALUATION OF MERITS

This Modification application seeks approval for the SCM disturbance extent to be adjusted to allow for construction and operation of a highwall diversion drain, which would be of minimal environmental impact.

To protect the approved SCM final highwall against erosion, a highwall diversion drain is proposed to be constructed along the top of the highwall. The drain would collect and convey surface water runoff from Sunnyside Hill to two small gullies either side of the highwall.

The Modification does not propose to change any other closure or rehabilitation aspect of the SCM.

Biodiversity values in the subject area have been assessed by AMBS (Appendix A). In accordance with section 7.17(2)(c) of the BC Act, the assessment concludes that the Modification would not increase impacts on biodiversity values (including the Koala). In fact, there would be a net reduction in land approved for disturbance at the SCM with the relinquishment of 0.32 ha that is currently approved for disturbance but not required to be disturbed.

Based on the information contained in this report, the consent authority can be satisfied that the SCM incorporating the Modification would remain substantially the same as the development authorised by PA 06\_0308 as last modified by Modification 3 and that the proposed Modification is of minimal environmental impact.

Overall, the SCM has operated in a manner that has achieved an acceptable level of environmental performance. Whitehaven has been proactive to manage any environmental issues that have arisen and any complaints raised by the local community.

The Modification can be implemented in accordance with the existing environmental limits and performance measures for the SCM, and with no net increase to the extent of disturbance.

## 8 REFERENCES

Archaeological Surveys & Reports Pty Ltd ( 2007) *Aboriginal Heritage Assessment for the Sunnyside Coal Project via Gunnedah*. Report prepared for Olsen Environmental Consulting Pty Ltd.

Department of Planning and Environment (2016) *Dark Sky Planning Guideline*.

Department of Planning, Industry and Environment (2020a) *Biodiversity Assessment Method*.

Department of Planning, Industry and Environment (2020b) *State Environmental Planning Policy Koala Habitat Protection 2020*.

Department of Planning, Industry and Environment (2021a) *Undertaking Engagement Guidelines for State Significant Projects*.

Department of Planning, Industry and Environment (2021b) *State Environmental Planning Policy Koala Habitat Protection 2021*.

Geoff Cunningham Natural Resource Consultants Pty Ltd (2007) *Flora Assessment for the Sunnyside Coal Project via Gunnedah*. Report prepared for Olsen Environmental Consulting Pty Ltd.

Kevin Mills & Associates (2007) *Koala Management Plan*

Kevin Mills & Associates (2008) *Fauna Survey and Assessment*. Report prepared for Olsen Environmental Consulting Pty Ltd.

*Preparing a Modification Report* (DPIE 2021).

Whitehaven Coal (2017a) *Sunnyside Coal Mine Koala Management Plan - Koala Management Plan*

Whitehaven Coal (2017b) *Sunnyside Coal Mine Aboriginal Cultural Heritage Management Plan (ACHMP)*.

Whitehaven Coal (2018a) *Sunnyside Coal Mine Water Management Plan* (14 June 2018).

Whitehaven Coal (2018b) *Sunnyside Closure Mining Operations Plan* (6 November 2018-5 November 2025).

Olsen Environmental Consulting Pty Limited and R.W. Corkery & Co. Pty Ltd (2008) *Non-Aboriginal Heritage Assessment*.

ATTACHMENT 1  
DETAILED STATUTORY COMPLIANCE RECONCILIATION TABLE

**Table A-1**  
**Summary Statutory Compliance for State Legislation**

Relevant Legislation or Instrument	Mandatory Consideration	Relevant Section in Modification Report	Modified Project Compliance Status
<i>Environmental Planning and Assessment Act 1979 (EP&amp;A Act)</i>			
section 1.3	Relevant objects of the EP&A Act: <ul style="list-style-type: none"> <li>■ Promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State’s natural and other resources.</li> <li>■ Facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment.</li> <li>■ Promote the orderly and economic use and development of land.</li> <li>■ Protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats.</li> <li>■ Promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage).</li> <li>■ Promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State.</li> <li>■ Provide increased opportunity for community participation in environmental planning and assessment.</li> </ul>	Section 4.1.2	✓
section 4.15	Relevant environmental planning instruments: <ul style="list-style-type: none"> <li>■ <i>State Environmental Planning Policy (Planning Systems) 2021</i></li> <li>■ <i>State Environmental Planning Policy (Resources and Energy) 2021</i></li> <li>■ <i>State Environmental Planning Policy (Resilience and Hazards) 2021</i></li> <li>■ <i>State Environmental Planning Policy (Biodiversity and Conservation) 2021</i></li> <li>■ <i>Gunnedah Local Environmental Plan 2012</i> (Gunnedah LEP).</li> <li>■ Any planning agreement or draft planning agreement that a developer has entered into under section 7.4 of the EP&amp;A Act.</li> <li>■ <i>The Environmental Planning and Assessment Regulation 2021</i> (EP&amp;A Regulation).</li> </ul> The likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality; the suitability of the site for the development; any submissions made in accordance with the EP&A Act or the EP&A Regulation; the public interest.	Section 4.1.3. Remainder of Table A-1. Table A-2.	✓

**Table A-1 (Continued)**  
**Summary Statutory Compliance for State Legislation**

Relevant Legislation or Instrument	Mandatory Consideration	Relevant Section in Modification Report	Modified Project Compliance Status
<i>Environmental Planning and Assessment Regulation 2021</i>			
clause 61(3)(b)	The consent authority is required to consider the <i>Dark Sky Planning Guideline</i> (Department of Planning and Environment, 2016). To the extent that clause 61(3) is relevant, the Modification would not change night lighting activities at the SCM, nor the previously approved impacts on the Siding Spring Observatory or Dark Sky Region.	-	✓
clause 98	Clause 98 provides for the circumstances in which a modification application may be made. In accordance with clause 98(1)(a), this Modification Application is made by SCM, a wholly owned subsidiary of Whitehaven, the owner of the land to which the Modification Application relates. With respect to clause 98(6), the SCM incorporating the Modification does not relate to land owned by a Local Aboriginal Land Council.	-	✓
clauses 99 and 100	<p>Clauses 99 and 100 of the EP&amp;A Regulation provide for the making and content of a modification application. With respect to these two clauses, this Modification Application:</p> <ul style="list-style-type: none"> <li>■ contains the information required by the EP&amp;A Act and EP&amp;A Regulation (refer to Sections 4.1 of this Modification Report);</li> <li>■ has been prepared in consideration of the guideline <i>Preparing a Modification Report</i> (DPIE, 2021);</li> <li>■ contains the information required by clause 100(1)(a) to (c) (Section 1) and a description of the Modification and its expected impacts (Sections 1 to 3 and 6); and</li> <li>■ is not accompanied by a biodiversity development assessment report (Section 4.2.1).</li> </ul>	Section 4.1 Sections 1 to 3, Section 6 Section 4.2.1	✓
clause 103	<p>Clause 103 of the EP&amp;A Regulation concerns applications to modify a development consent that relates to "mining or petroleum development" on certain land.</p> <p>With respect to this clause and the defined meaning of "mining or petroleum development" in the <i>State Environmental Planning Policy (Resources and Energy) 2021</i> (clause 2.24[A]), no mining lease under the <i>Mining Act 1992</i> is required to be issued to enable the development as modified to be carried out, because the relevant SCM development (as modified) would continue to be carried out within the land subject to the existing mining leases for the SCM. As such, this Modification Application is not accompanied by a current gateway certificate or a site verification certificate.</p>	-	✓
clause 105	Division 2 of Part 5 of the EP&A Regulation provides for the public notification of modification applications. The consent authority is required to attend to the relevant public notice requirements in this Division. In this regard, clause 105(4) states that notice of modification applications involving minimal environmental impact do not apply to State significant development, such as the SCM.	-	✓

**Table A-1 (Continued)**  
**Summary Statutory Compliance for State Legislation**

Relevant Legislation or Instrument	Mandatory Consideration	Relevant Section in Modification Report	Modified Project Compliance Status
<i>Biodiversity Conservation Act 2016</i>			
section 7.14(2)	The consent authority is to take into consideration the likely impact of the proposed development on biodiversity values as assessed in the BDA R.A Biodiversity Assessment prepared by AMBS for the Modification (Appendix A) concludes that the Modification would not increase impacts on biodiversity values, including threatened species and ecological communities, relative to the impacts already approved.	Section 4.2.1 Section 6.1	✓
section 7.16(3)	If the consent authority is of the opinion that the RUM (as modified) is likely to have serious and irreversible impacts on biodiversity values, the consent authority is required to: <ul style="list-style-type: none"> <li>■ take those impacts into consideration; and</li> <li>■ determine whether there are any additional and appropriate measures that will minimise those impacts if consent or approval is to be granted.</li> </ul>	Section 4.2.1 Section 6.1	✓
<i>Mining Act 1992</i>			
section 380AA	An application for development consent to mine for coal cannot be made or determined unless the applicant is the holder of an authority that is in force in respect of coal for the relevant land, or the applicant has the written consent of the holder of such an authority to make the application.	Section 4.2.2	✓
<i>National Parks and Wildlife Act 1974 (NPW Act)</i>			
section 90	Division 2 of Part 6 of the NPW Act provides for Aboriginal Heritage Impact Permits (AHIPs). In accordance with section 4.41 of the EP&A Act, AHIPs are not required for projects classified as SSD and approved under Part 4 of the EP&A Act.	Section 4.2.3	✓
<i>Protection of the Environment Operations Act 1997 (PoEO Act)</i>			
section 43	The SCM has been operated under EPL 12957, granted under the PoEO Act, which allows for coal works and mining for coal as scheduled activities. The EPL contains conditions that relate to emission and discharge limits, environmental monitoring and reporting.	Section 4.2.4	✓
<i>Water Management Act 2000</i>			
sections 89, 90 and 91	Whitehaven holds appropriate licences under the <i>Water Management Act 2000</i> for the existing activities at the SCM. Appropriate licences under the <i>Water Management Act 2000</i> would continue to be held.	Section 4.2.5	✓

**Table A-2**  
**Summary Statutory Compliance for Environmental Planning Instruments**

Relevant Legislation or Instrument	Mandatory Consideration	Relevant Section in Modification Report	Modified Project Compliance Status
<i>State Environmental Planning Policy (Planning Systems) 2021</i>			
clause 2.1	Clause 2.1 of the Planning Systems SEPP outlines the aims of the policy, that includes identifying development that is State Significant Development. The SCM falls within item 5 of Schedule 1 of the Planning Systems SEPP as it is development for the purpose of mining that is coal mining. Under clause 2.6 of the Planning Systems SEPP the SCM is, therefore, a State Significant Development for the purposes of the EP&A Act.	-	✓
<i>State Environmental Planning Policy (Resources and Energy) 2021</i>			
clause 2.1	The Modification is generally consistent with the relevant aims of Chapter 2 (Mining, petroleum and extractive industries) of the Resource and Energy SEPP because it: <ul style="list-style-type: none"> <li>■ provides for the ongoing safe and efficient closure and rehabilitation of a significant coal mine that the State approved to be mined, subject to the conditions of the relevant State approvals; and</li> <li>■ can be implemented in accordance with the existing environmental limits and performance measures for the SCM.</li> </ul>	-	✓
clause 2.9	Clause 2.9 states that development for the purpose of mining may be carried out (with consent) on land where agriculture or industry may be carried out (with or without development consent). The Modification is entirely within the SCM mine tenement (ML 1624) where development for the purposes of agriculture or industry may be carried out (with or without consent) under the Gunnedah LEP.	-	✓
clause 2.16	The Modification would not increase any associated potential impacts listed as non-discretionary development standards.	-	✓
clause 2.17	Before determining an application for consent for the purposes of mining the consent authority must: <ol style="list-style-type: none"> <li>(a) consider – <ol style="list-style-type: none"> <li>(i) the existing uses and approved uses of land in the vicinity of the development, and</li> <li>(ii) whether or not the development is likely to have a significant impact on the uses that, in the opinion of the consent authority having regard to land use trends, are likely to be the preferred uses of land in the vicinity of the development, and</li> <li>(iii) any ways in which the development may be incompatible with any of those existing, approved or likely preferred uses, and</li> </ol> </li> <li>(b) evaluate and compare the respective public benefits of the development and the land uses referred to in paragraph (a)(i) and (ii), and</li> <li>(c) evaluate any measures proposed by the applicant to avoid or minimise any incompatibility, as referred to in paragraph (a)(iii).</li> </ol> <p>Land use in proximity of the SCM consists of agriculture, state forest, rural residences and the township of Gunnedah. As the Modification occurs entirely within ML 1624, the Modification is considered compatible with existing approved land uses.</p>	-	✓

**Table A-2 (Continued)**  
**Summary Statutory Compliance for Environmental Planning Instruments**

Relevant Legislation or Instrument	Mandatory Consideration	Relevant Section in Modification Report	Modified Project Compliance Status
<i>State Environmental Planning Policy (Resources and Energy) 2021</i>			
clause 2.19	<p>Before determining an application for development in the vicinity of mining, petroleum or extractive industry, the consent authority must (among other things) consider whether or not the development is likely to have a significant impact on current or future extraction or recovery of minerals, petroleum or extractive materials (including by limiting access to, or impeding assessment of, those resources), and any ways in which the development may be incompatible with any of those existing or approved uses or that current or future extraction or recovery.</p> <p>The Modification is entirely consistent and compatible with the currently approved land use, which is coal mining.</p> <p>The Modification would provide for the ongoing safe and efficient closure and rehabilitation of the SCM in accordance with the relevant State approval conditions. In particular, the Modification would contribute to meeting the State approval conditions related to rehabilitation and closure of the SCM, including that the final landform highwall is geotechnically stable and safe.</p> <p>As such, no additional measures to avoid or minimise incompatibility with existing and approved surrounding land uses are required.</p>	-	✓
clause 2.20	<p>Before determining an application for consent for the purposes of mining the consent authority must consider whether or not the consent should be issued subject to conditions aimed at ensuring that the development is undertaken in an environmentally responsible manner (including conditions to ensure that impacts on significant water resources, including surface and groundwater resources, are avoided, or are minimised to the greatest extent practicable, that impacts on threatened species and biodiversity, are avoided, or are minimised to the greatest extent practicable, and that greenhouse gas emissions are minimised to the greatest extent practicable).</p> <p>In relation to the above:</p> <ul style="list-style-type: none"> <li>■ The Modification would divert surface water runoff from an undisturbed (clean water) catchment south of the highwall to downstream unnamed gullies, thereby reducing the amount of surface water entering the final depression area.</li> <li>■ The proposed highwall diversion drain has been designed to reduce the requirement for additional disturbance as much as possible.</li> <li>■ The Biodiversity Assessment prepared for the Modification (Appendix A) concludes that the Modification would not increase impacts on biodiversity values.</li> </ul>	-	✓
clause 2.22	<p>Before determining an application for consent for the purposes of mining the consent authority must consider whether or not the consent should be issued subject to conditions regarding transport of materials.</p> <p>The Modification would not change vehicle movements on public roads given it would not change employment and coal extraction and transport no longer occurs. The SCM incorporating the Modification would continue to progress in accordance with current approvals.</p>	-	✓

**Table A-2 (Continued)**  
**Summary Statutory Compliance for Environmental Planning Instruments**

Relevant Legislation or Instrument	Mandatory Consideration	Relevant Section in Modification Report	Modified Project Compliance Status
<i>State Environmental Planning Policy (Resources and Energy) 2021</i>			
clause 2.23	<p>Before determining an application for consent for the purposes of mining the consent authority must consider whether or not the consent should be issued subject to conditions regarding rehabilitation, including the particular considerations set out in clause 17(2).</p> <p>The Modification would not change the overarching SCM rehabilitation goal to create a final landform that is safe, stable and non-polluting, with geotechnical performance and hydrological function including drainage) maximised, and groundwater and visual impacts minimised.</p>	-	✓
<i>State Environmental Planning Policy (Resilience and Hazards) 2021</i>			
clause 4.6	<p>A consent authority must consider whether the land is contaminated and be satisfied that, if the land is contaminated, the land is suitable in its contaminated state (or will be suitable after remediation) for the purpose of the Project.</p> <p>The highwall drain footprint is not considered to be contaminated land. In this regard, no land within the additional disturbance area is listed in the EPA's Contaminated Land Register. As the highwall drain footprint is small in comparison to the approved mine, no material change in land use would occur.</p>	-	✓
<i>State Environmental Planning Policy (Biodiversity and Conservation) 2021</i>			
	<p>The Biodiversity and Conservation SEPP commenced on 2 March 2022. Chapter 3 (Koala habitat protection 2020) of Biodiversity and Conservation SEPP applies to land zoned as RU1, RU2 and RU3, outside of the Sydney Metropolitan Area and the Central Coast.</p> <p>Part 3.2 of the Biodiversity and Conservation SEPP contains provisions relating to development control of koala habitat with respect to development applications for which the local council is the consent authority.</p> <p>To the extent that Part 3.2 is relevant, it is noted that:</p> <ul style="list-style-type: none"> <li>■ the highwall drain footprint is not "potential koala habitat"; and</li> <li>■ the highwall drain footprint is not "core koala habitat".</li> </ul> <p>A Biodiversity Assessment has been prepared by AMBS for the Modification and is provided in Appendix A. The assessment considered the potential impact of the highwall drain on the Koala in consideration of the Biodiversity and Conservation SEPP. The assessment concludes that the likely and potential impacts of the Modification on Koalas or Koala habitat is negligible. The subject site does not have any trees that are recognised as Koala use trees and is not core Koala habitat.</p> <p><i>(Continued next page)</i></p>	-	✓

**Table A-2 (Continued)**  
**Summary Statutory Compliance for Environmental Planning Instruments**

Relevant Legislation or Instrument	Mandatory Consideration	Relevant Section in Modification Report	Modified Project Compliance Status
<i>State Environmental Planning Policy (Biodiversity and Conservation) 2021 (Continued)</i>			
	<p>Since the Modification is an application to modify Project Approval (06_0308) under section 4.55(1A) of the EP&amp;A Act, the Gunnedah Shire Council will not be the consent authority. The provisions of Biodiversity and Conservation SEPP do not apply in circumstances where the consent authority is not the Council.</p> <p>Notwithstanding, following the identification of core koala habitat (as defined by the then <i>SEPP 44 – Koala Habitat Protection</i> [SEPP 44]) in the SCM, Whitehaven prepared a <i>Koala Management Plan</i> in accordance with the Project Approval conditions (Condition 23). The <i>Koala Management Plan</i> was approved under SEPP 44 and continues to have effect under the Biodiversity and Conservation SEPP.</p> <p>The <i>Koala Management Plan</i> relevantly states:</p> <p><i>All stands of woodland across the property and on the adjoining road reserves of Coocooboona Lane and the Oxley Highway, are considered to be part of the koala habitat.</i></p> <p>Additionally, the <i>Koala Management Plan</i> states:</p> <p><i>The remnant woodland in the following areas will be protected from degrading activities such as clearing, grazing, storing and dumping materials and vehicle incursion not related to management:</i></p> <p><i>Woodland corridor along Coocooboona Lane;</i></p> <p><i>Treed corridor along the inside of the western boundary of the site; and</i></p> <p><i>Major areas of woodland in the south of the site and beyond within the “Sunnyside” property.</i></p> <p>The <i>Koala Management Plan</i> states that these remnant woodland areas are to be protected from clearing. The highwall drain is outside the remnant woodland areas to be protected from clearing under the <i>Koala Management Plan</i>.</p> <p>It is noted that the proposed highwall drain is partly within the areas designated as “Proposed New Vegetation to Create Koala Corridors” and “Proposed Rehabilitation – Woodland” in the <i>Koala Management Plan</i>. As such, the <i>Koala Management Plan</i> would be updated to reflect the Modification.</p>	-	✓

**Table A-2 (Continued)**  
**Summary Statutory Compliance for Environmental Planning Instruments**

Relevant Legislation or Instrument	Mandatory Consideration	Relevant Section in Modification Report	Modified Project Compliance Status
<i>Gunnedah LEP</i>			
clause 2.3	<p>The consent authority must have regard to the objectives for development in a zone when determining a development application in respect of land within the zone.</p> <p>Under the Gunnedah LEP, the highwall diversion drain is land zoned as RU1 – Primary Production. Under the Gunnedah LEP, development for the purpose of “open cut mining” is permissible with consent on land zone RU1 – Primary Production.</p> <p>Under the Gunnedah LEP, the objectives of the RU1 – Primary Production zone are:</p> <ul style="list-style-type: none"> <li><i>To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.</i></li> <li><i>To encourage diversity in primary industry enterprises and systems appropriate for the area.</i></li> <li><i>To minimise the fragmentation and alienation of resource lands.</i></li> <li><i>To minimise conflict between land uses within this zone and land uses within adjoining zones.</i></li> <li><i>To provide for a range of ecologically sustainable agricultural and rural land uses and development on broad acre rural lands.</i></li> <li><i>To protect significant agricultural resources (soil, water and vegetation) in recognition of their value to Gunnedah’s longer term economic sustainability.</i></li> <li><i>To conserve and enhance the quality of valuable environmental assets, including waterways, riparian land, wetlands and other surface and groundwater resources, remnant native vegetation and fauna movement corridors as part of all new development and land use.</i></li> </ul> <p>The Modification is consistent with the objectives of RU1 – Primary Production zone as it is considered to be consistent with the existing and approved mining operation and would not restrict the use of adjoining land uses.</p>	-	✓

APPENDIX A  
SUNNYSIDE COAL MINE HIGHWALL DRAIN MODIFICATION BIODIVERSITY ASSESSMENT



# Sunnyside Mine highwall drain modification biodiversity assessment

Prepared by AMBS Ecology & Heritage Pty Ltd  
for Whitehaven Coal Limited

Final Report

February 2022

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## Document Information

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<b>Author(s):</b>	Mark Robinson
<b>Recipient:</b>	Tony Dwyer
<b>Approved by:</b>	Glenn Muir

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# 1 Introduction

## 1.1 Background

Whitehaven Coal Limited (Whitehaven) is proposing to modify Project Approval (PA 06\_0308) for the Sunnyside Coal Mine to allow for the construction of a surface water drain along the final landform highwall at the southern boundary of the approved disturbance area. The purpose of the drain is to manage the upslope drainage above and away from the rehabilitated mine void and lessen the likelihood of stormwater from large rainfall events spilling over an existing berm and causing erosion and dispersal of sediment from the mine void highwall. The drain disturbance footprint would be revegetated with native groundcover species and with native trees in appropriate locations (i.e. adjacent to the drain).

Minor works associated with the modification include the construction of a suitable berm and improving the existing maintenance access track that skirts the rehabilitated mine void and associated highwall. Construction of the drain would require a modification to the approved disturbance area, such that some areas that are not currently part of the approved disturbance area would need to be cleared and some areas that are currently part of the approved disturbance area would no longer be required.

AMBS Ecology & Heritage Pty Ltd (AMBS) were engaged by Whitehaven to undertake a biodiversity assessment in relation to the proposed modification. The purpose of the assessment is to consider whether the modification would or would not result in an increased impact on biodiversity values.

The scope of work for this biodiversity assessment is set out in Section 1.2 below. The “biodiversity values” to be assessed are those identified by the NSW *Biodiversity Conservation Act 2016* (BC Act) and the NSW *Biodiversity Conservation Regulation 2017* (BC Regulation) and listed in Table 1-1. Figure 1-1 shows the area to be cleared for the proposed modification that is not currently part of the approved disturbance area (“Additional Disturbance”) and the areas that are currently part of the approved disturbance area but are no longer required (“Approved Disturbance Not Required”).

## 1.2 Scope of Work

The scope of work commissioned for this biodiversity assessment includes:

1. Identification of Plant Community Types (PCTs);
2. Collection of vegetation integrity plot data as per the Biodiversity Assessment Method (BAM) (Department of Planning, Industry and Environment [DPIE], 2020) on the Additional Disturbance and the Approved Disturbance Not Required (applying the minimum plot requirements on each study area individually);
3. Calculation of a vegetation integrity score using the BAM Calculator (BAM-C) for the Additional Disturbance and the Approved Disturbance Not Required;
4. Comparison of the threatened species known or likely to occur in the Additional Disturbance with those known or likely to occur in the Approved Disturbance Not Required;
5. Preparation of an assessment of potential impacts on the biodiversity values listed in Table 1-1;
6. Conclusion as to the likelihood of significant impacts on Matters of National Environmental Significance (MNES) under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act); and
7. Consideration of any relevant requirements of the *State Environmental Planning Policy (Koala Habitat Protection) 2021* (SEPP 2021) (DPIE, 2021a).



Figure 1-1: Study Area

**Table 1-1: Biodiversity values assessed for this study**

Biodiversity Value	Meaning
Vegetation abundance Section 1.4(b) BC Regulation	Occurrence and abundance of vegetation at a particular site
Vegetation integrity Section 1.5(2)(a) BC Act	Degree to which the composition, structure and function of vegetation at a particular site and the surrounding landscape has been altered from a near natural state
Habitat suitability Section 1.5(2)(b) BC Act	Degree to which the habitat needs of threatened species are present at a particular site
Threatened species abundance Section 1.4(a) BC Regulation	Occurrence and abundance of threatened species or threatened ecological communities, or their habitat, at a particular site
Habitat connectivity Section 1.4(c) BC Regulation	Degree to which a particular site connects different areas of habitat of threatened species to facilitate the movement of those species across their range
Threatened species movement Section 1.4(d) BC Regulation	Degree to which a particular site contributes to the movement of threatened species to maintain their lifecycle
Flight path integrity Section 1.4(e) BC Regulation	Degree to which the flight paths of protected animals over a particular site are free from interference
Water sustainability Section 1.4(f) BC Regulation	Degree to which water quality, water bodies and hydrological processes sustain threatened species and threatened ecological communities at a particular site

### 1.3 Subject Site

The subject site (Part of Lot 12 DP 755503) is a narrow strip of land located above and to the south of the final void highwall of the Sunnyside Coal Mine which includes the Additional Disturbance and the Approved Disturbance Not Required. A berm and vehicle track skirt the mine void. Upslope and adjacent to the berm and vehicle track are patches of wooded areas and disturbed grasslands that were mapped by Cunningham (2007) as:

- “Cleared Cropland and Pastureland”; and
- “*Atalaya hemiglauca* (Whitewood) Community”.

Well vegetated woody habitats occur upslope and to the south of the subject site and a range of other plant communities were mapped by Cunningham (2007) in this area (e.g. “Dry Scrub Community of the Rocky Scarp”).

Between the subject site and upslope vegetated areas, a Koala-proof fence was installed prior to the commencement of mining operations as recommended in the initial Koala Management Plan (Mills 2007) (Figure 1-1).

## 2 Methodology

The field assessment was undertaken by Mark Robinson with assistance from Michael Somerville and the BAM-C calculations were undertaken by Elise Connolly. Field surveys were undertaken on 26 and 27 August 2021.

**Table 2-1: Experience and Qualifications of AMBS Personnel**

Name	Qualifications	Experience
Michael Somerville	Bachelor of Science	14 years' experience
	Graduate Diploma in Natural Resource Management	
	Accredited BAM Assessor (BAAS18098)	
Mark Robinson	Bush Regeneration Certificate	30 years' experience
	Associate Diploma in Horticulture	
	Graduate Diploma in Environmental Management	
	Masters in Environmental Management & Restoration	
Elise Connolly	Diploma of Conservation and Land Management	8+ years' experience
	Diploma of Applied Environmental Management	
	BAM Accredited Assessor: BAAS19025	

### 2.1 Vegetation

The subject site was divided into two qualitative condition zones (Figure 2-1):

1. Mostly dominated by native trees; and
2. Mostly dominated by exotic grasses and/or forbs.

The area mostly dominated by native trees occurred in the western half of the subject site and encompassed a patch of the Approved Disturbance Not Required area and approximately half of the Additional Disturbance area (Figure 2-1). The area mostly dominated by exotic grasses and/or forbs occurred in the eastern half of the subject site and also encompassed a patch of the Approved Disturbance Not Required area and approximately the other half of the Additional Disturbance area (Figure 2-1).

It was therefore possible to divide the subject site into four areas across the two condition zones with one plot (sample site) in each area (Table 2-2; Figure 2-1).

**Table 2-2: Sample sites**

Zone	Sample Strata	Sample Site	Area (ha)
<b>Mostly dominated by native trees</b>			
<b>1A</b>	Approved Disturbance Not Required	SSBP0000	0.08
<b>1B</b>	Additional Disturbance Required to Improve Drainage	SSBP0001	0.09
<b>Mostly dominated by exotic grasses and/or forbs</b>			
<b>2A</b>	Approved for Disturbance Not Required	SSBP0003	0.24
<b>2B</b>	Additional Disturbance Required to Improve Drainage	SSBP0002	0.06

The BAM-C was used to calculate a Vegetation Integrity (VI) score for each zone. The VI scores were used to inform the assessment of the proposed modification.

The VI sampling method and data collected followed those described in the BAM (DPIE, 2020) for assessing floristic composition and structure (400 m<sup>2</sup> plots) and functional attributes (1,000 m<sup>2</sup> plots)(Appendix 6). One site (Zone 1A; SSBP0000) was configured with the typical 20 m x 20 m plot

for floristic composition and 20 m x 50 m for functional attributes. Due to the narrowness of the remainder of the subject site, the other three plots (SSBP0001, SSBP0002, SSBP0003) were configured as 10 m x 40 m plots for floristic composition and 10 m x 100 m plots for functional attributes, which complies to the BAM (DPIE, 2020) requirements for linear areas. Due to the small area, narrowness and curve of the subject site, portions of some plots extended outside mapped polygon boundaries but were still representative of the vegetation within the polygons (Figure 2-1).

In order to calculate VI scores, the following attributes were recorded at each sample site and subsequently entered into the BAM-C (DPIE, 2021):

- Richness and cover of various growth form groups (trees, shrubs, grass and grass-like, forbs, ferns and others); and
- A number of attributes to assess function, including:
  - The number of large trees;
  - Tree regeneration;
  - Tree stem size classes;
  - Total length of fallen logs;
  - Litter cover; and
  - High threat weed cover.

## 2.2 Fauna

The suitability of fauna habitat was assessed according to:

- Structural and floristic attributes collected in accordance with the BAM (DPIE, 2020);
- Qualitative habitat assessment in each zone;
- Opportunistic observations of species or evidence that species may utilise habitat at the subject site;
- Review of previous fauna surveys undertaken in the vicinity of the subject site (e.g. Mills, 2008; AMBS, 2021); and
- Search of the Australian Birdlife database; and
- Search of the NSW BioNet Atlas (NSW DPIE, 2021d,e)

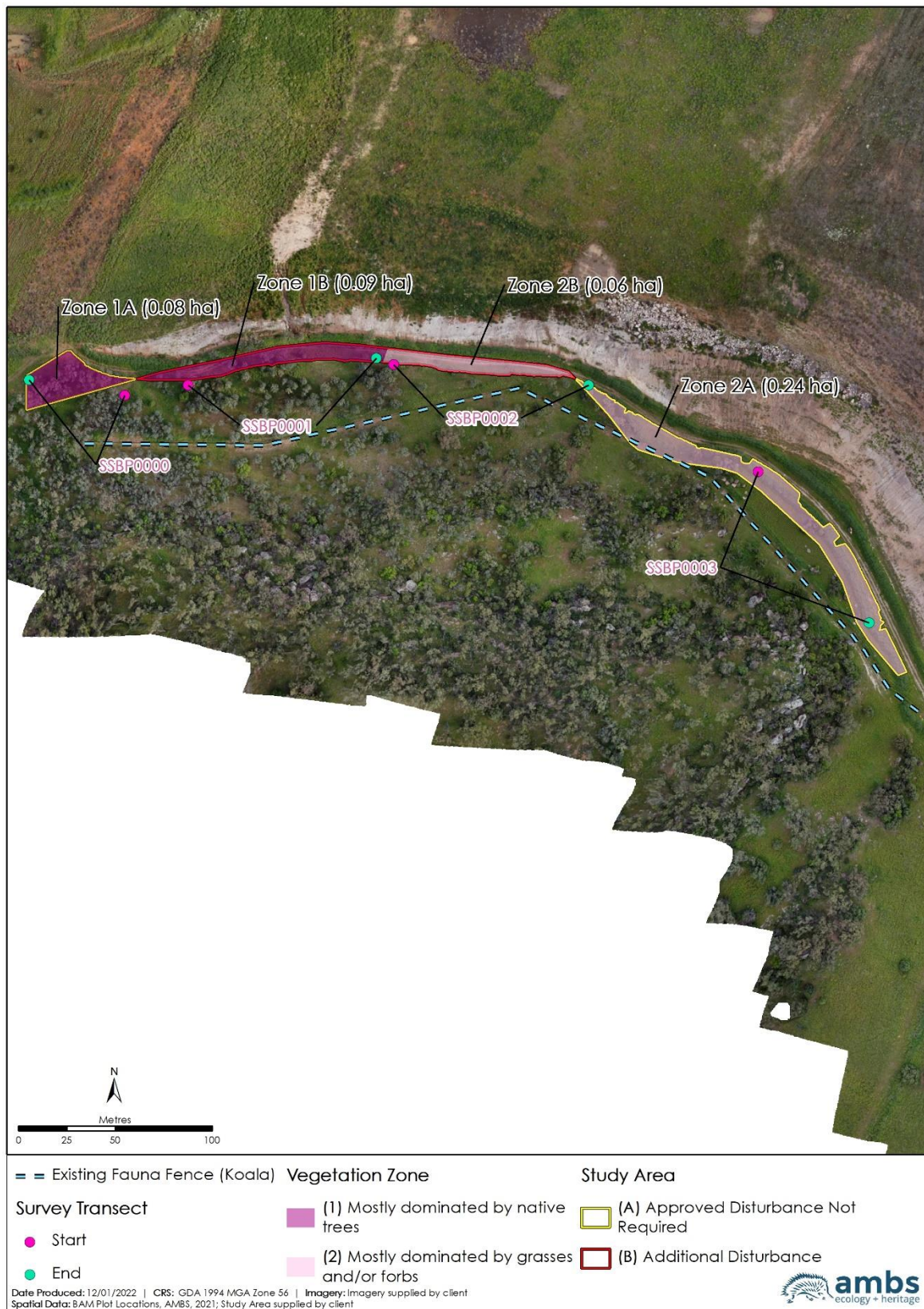


Figure 2-1: Location of zones and sample locations.

### 3 Results

#### 3.1 Plant Species

A total of 65 vascular plant species were recorded in the four sample plots (400 m<sup>2</sup>) (Appendix 1). Of these, at least 49 were native species and 16 exotic species, as well as one exotic individual belonging to the *Sisymbrium* genus present as a sterile germinant that may have been either *S. irio* or *S. officinale* (Appendix 1). No threatened plant species were observed during the field surveys.

Native species richness was highest in Zone 1A (Figure 3-1). The relative proportion of native to weed species richness differed between zones. Weed species richness was lowest in Zones 1A and 1B.

The invasive Buffel Grass (*Cenchrus ciliaris*) was found at all sites, but the percentage cover varied considerably and was low in Zone 1A (Figure 3-2).

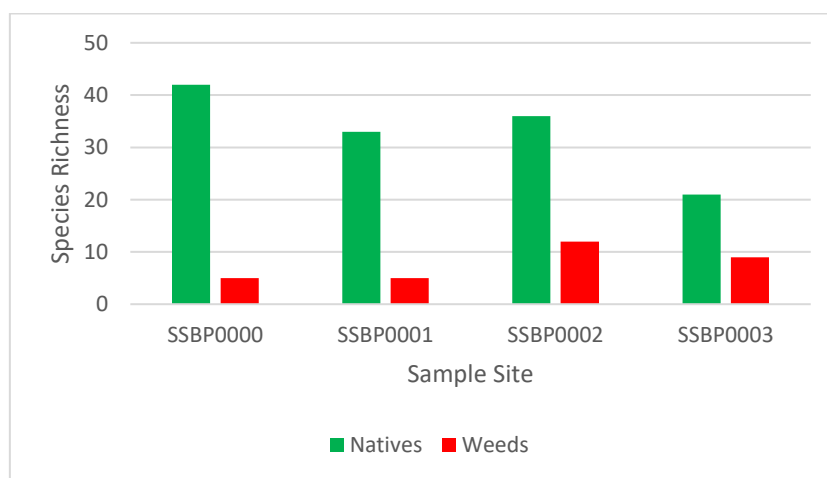


Figure 3-1: Native and weed species richness by sample site

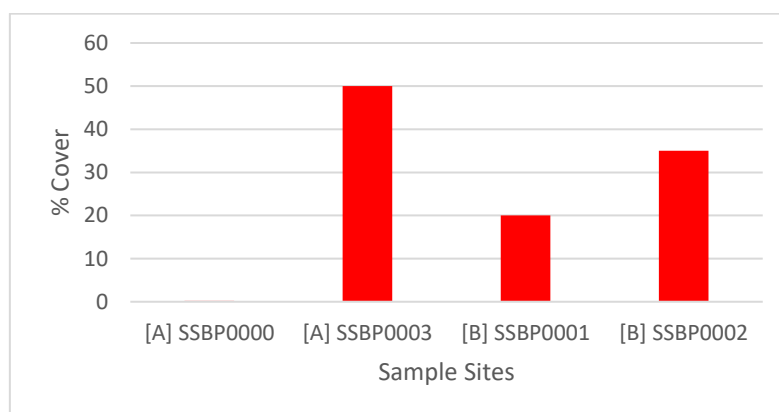


Figure 3-2: Buffel Grass (*Cenchrus ciliaris*) % cover in areas [A] Approved for Disturbance Not Required and [B] Additional Disturbance

### 3.1 Plant Community Types

Two plant communities occurred on the subject site. The plant community in Zone 1 was identified as PCT 147 *Mock Olive-Wilga-Peach Bush-Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion* and is described in Table 3-1. The plant community in Zone 2 was classified as Non-native Vegetation and is described in Table 3-2.

The PCT 147 *Mock Olive-Wilga-Peach Bush-Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion* was considered the best fit for the vegetation in Zones 1A and 1B for the reasons outlined in Table 3-1. However, there are some atypical attributes to this vascular plant assemblage. The soils are on sedimentary rather than volcanic basalt; however, the PCT description notes the qualitative 'mainly on basalt'.

The dominance of *Atalaya hemiglauca* is notable and was previously recognised in the vegetation assessment of Cunningham (2007), who identified this patch as a separate community to highlight its dominance and notes that they have been lopped at some time for fodder. Cunningham (2007) also recognises another community, namely "*Community 5 – Dry Scrub Community of the Rocky Scarp*", that could also be aligned post-hoc with PCT 147 based on the description in that assessment.

An important overview of western slopes dry rainforest and its classification by Curran *et al* (2008) does not identify an *Atalaya hemiglauca* assemblage over the entire geographic range of their study area. *Atalaya hemiglauca* is only mentioned once (in context of its leaf size) in the Curran *et al* (2008) overview, whereas other trees in PCT 147 such as *Geijera parviflora* and *Ehretia membranifolia* are frequently cited in descriptions and discussion in that work.

Table 3-1: PCT 147

<b>Vegetation Zone</b>	Zone 1A and 1B: Mostly dominated by native trees
<b>Area</b>	Zone 1A (0.08 ha) Zone 1B (0.09 ha)
<b>PCT</b>	<b>147</b> Mock Olive-Wilga-Peach Bush-Carissa semi-evergreen vine thicket (dry rainforest) mainly on basalt soils in the Brigalow Belt South Bioregion
<b>Zone Condition</b>	Good
<b>Formation</b>	Rainforests
<b>Class</b>	Western Vine Thickets
<b>Percent Cleared</b>	75% (NSW Government 2021)
<b>Zone Description</b>	
<p>The tree layer is clearly dominated by <i>Atalaya hemiglauca</i> in both samples but there are more specimens (canopy, mid-strata and ground-layer) across the whole 1000 m<sup>2</sup> sample in 1A (SSBP0000) than 1B (SSBP0001) (95 specimens in former, 48 in latter). The shrub layer is relatively sparse in both samples with c. 10% cover in the mid-layer (400 m<sup>2</sup> samples) and may be a result of historical disturbances. The ground layer vegetation cover is not too dissimilar although Zone 1A has a considerably larger proportion cover by surficial rock than Zone 1B. Zone 1A is more species rich than 1B (42 species in former and 33 species in latter) and both have five exotic species present; however, the ground-layer for Zone 1B has relatively higher weed cover e.g. Buffel Grass (<i>Cenchrus ciliaris</i>) has an estimated 0.2% cover in Zone 1A compared to 20% cover in Zone 1B.</p>	
<b>Justification for PCT Allocation</b>	
<p>All PCTs were considered within the IBRA and sub IBRA region. The determination of the PCT was based on the position in the landscape, the structure and the dominant floristics per vegetation layer in areas assessed to be in moderate (SSBP0001) to good condition (SSBP0000).</p> <p>BioNet describes PCT 147 as "Mid-high to low closed or open forest known as "semi-evergreen vine thicket" dominated by rich diversity of low trees and shrubs to about 6 m high".</p> <p>Upper stratum trees can include <i>Alphitonia excelsa</i>; <i>Ehretia membranifolia</i>; <i>Ventilago viminalis</i>; <i>Psydrax oleifolia</i>; <i>Acacia salicina</i>; <i>Alectryon subdentatus</i>; <i>Capparis mitchellii</i>; and <i>Atalaya hemiglauca</i>. Emergent trees to c. 15 m are often present &amp; include <i>Eucalyptus melanophloia</i>, <i>Callitris glaucophylla</i>, <i>Eucalyptus albens</i> and <i>Casuarina cristata</i>.</p> <p>The shrub layer may be mid-dense or dense and includes <i>Notelaea microcarpa</i> var. <i>microcarpa</i>; <i>Carissa ovata</i>; <i>Spartothamnella juncea</i>; <i>Solanum parvifolium</i>; <i>Beyeria viscosa</i>; <i>Geijera parviflora</i>; <i>Rhagodia parabolica</i>; <i>Pimelea neo-anglica</i>; <i>Phyllanthus subcrenulatus</i>; <i>Dodonaea viscosa</i> subsp. <i>angustifolia</i>; <i>Abutilon oxycarpum</i>; <i>Enchylaena tomentosa</i>; <i>Maytenus bilocularis</i>; <i>Olearia elliptica</i> subsp. <i>elliptica</i>; <i>Indigofera adesmiifolia</i>; <i>Indigofera brevidens</i>; <i>Malvastrum coromandelianum</i>; <i>Breynia cernua</i>; <i>Senna coronilloides</i>; <i>Solanum semiarmatum</i>; <i>Solanum mitchellianum</i>; <i>Pittosporum spinescens</i>; <i>Cassinia laevis</i>; <i>Myoporum montanum</i>; <i>Senna coronilloides</i>.</p> <p>Vines are common and include <i>Pandorea pandorana</i>, <i>Parsonsia eucalyptophylla</i>, <i>Clematis microphylla</i> var. <i>microphylla</i>, <i>Cayratia clematidea</i> and <i>Jasminum lineare</i>. Mistletoes include <i>Lysiana exocarpi</i>, <i>Lysiana subfalcata</i> and <i>Amyema miraculosum</i>.</p> <p>The ground cover is mid-dense in open areas or sparse under dense tree or shrub canopies and may include <i>Austrostipa verticillata</i>; <i>Panicum queenslandicum</i> var. <i>queenslandicum</i>; <i>Rytidosperma bipartitum</i>; <i>Dichondra</i> sp. A; <i>Leptochloa decipiens</i> subsp. <i>asthenes</i>; <i>Desmodium brachypodum</i>; <i>Chloris ventricosa</i>; <i>Paspalidium gracile</i>; <i>Cymbopogon refractus</i>; <i>Nyssanthes diffusa</i>; <i>Brunoniella australis</i>; <i>Thellungia advena</i>; <i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>; <i>Aristida gracilipes</i>; <i>Austrostipa ramosissima</i>; <i>Austrostipa scabra</i> subsp. <i>scabra</i>; <i>Bothriochloa decipiens</i>; <i>Monachather paradoxus</i>; <i>Rytidosperma fulvum</i>; <i>Anthosachne plurinervis</i>; <i>Dichanthium sericeum</i> subsp. <i>sericeum</i>; <i>Solanum prinophyllum</i>; <i>Abutilon cryptopetalum</i>; <i>Cymbopogon refractus</i>; <i>Cyperus gracilis</i>; <i>Tephrosia brachyodon</i>; <i>Poa sieberiana</i> var. <i>hirtella</i>; <i>Vittadinia cuneata</i>; <i>Vittadinia sulcata</i>; <i>Wahlenbergia gracilis</i>; <i>Hypericum gramineum</i>; <i>Carex breviculmis</i>.</p> <p>PCT 147 was considered to be the best fit for this zone based on the tree <i>Atalaya hemiglauca</i>, <i>Capparis mitchellii</i> and <i>Ehretia membranifolia</i> observed and the presence of the following species: <i>Geijera</i></p>	

<i>parviflora</i> , <i>Myoporum montanum</i> , <i>Teucrium junceum</i> , <i>Pimelea neo-anglica</i> , <i>Parsonsia</i> spp, <i>Jasminum lineare</i> , <i>Clematis microphylla</i> , <i>Lysiana subfalcata</i> , <i>Solanum parviflorum</i> , <i>Austrostipa verticillate</i> and <i>Austrostipa scabra</i> .	
<b>Listed Status</b>	PCT 147 is included, in part, in the Endangered Ecological Community (EEC) <i>Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions</i> listed under the BC Act and also, in part, the EEC <i>Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions</i> listed under the EPBC Act. The expression of PCT 147 in this location is not considered to be part of either EEC (see reasoning below).
<b>Threatened Flora</b>	None observed

**Table 3-2: Non-native Vegetation**

<b>Vegetation Zone</b>	Zone 2A and 2B: Mostly dominated by exotic grasses and/or forbs
<b>Area</b>	Zone 2A (0.24ha) Zone 2B (0.06ha)
<b>PCT</b>	Not Applicable: Non-Native Vegetation (NSW EES, 2020) Vegetation Classification: Exotic grass and forb land
<b>Zone Condition</b>	Poor. This zone has been disturbed both from historical disturbances (i.e. farming) as evident in pre-mining operations aerial imagery and vegetation mapping (Cunningham, 2007; his Figures 2 and 5) to during and post mining operation where the edge to the mine void has been disturbed with, for example, the construction of the extant berm and vehicle track. The historical and relatively recent disturbance history coupled with exotic species and low native plant cover has facilitated dominance by exotic grasses and forbs. For example, the invasive Buffel Grass ( <i>Cenchrus ciliaris</i> ) covers an estimated 35% and 50% (in 400 m <sup>2</sup> sample) in Zone 2B and Zone 2A respectively. Though exotic species predominate, there are some native species persisting (e.g. protected near large rocks) or regenerating, but have a low cover or abundance. For the purpose of this report and subsequent Vegetation Integrity assessment, the PCT expected to have previously occur at this site was PCT 147 as informed by the relict and regenerating <i>Atalaya hemiglauca</i> but also the presence of <i>Abutilon oxycarpum</i> , <i>Austropstipa verticillata</i> , <i>A. scabra</i> and <i>Geijera parviflora</i> .

The NSW BioNet Vegetation Classification Community Profile Report (DPIE, 2021b) does describe a *Atalaya hemiglauca* dominated vegetation assemblage, PCT 146 (*Whitewood low open woodland of the Brigalow Belt South Bioregion and north-eastern Darling Riverine Plains Bioregion*), however, the description does not include the richness of dry rainforest species that were found on site in Zone 1 and as included in the PCT 147 description.

In conclusion, Zone 1 was classified as PCT 147, despite the atypical dominance of *Atalaya hemiglauca* but that is likely, at least in part, a legacy of the site's disturbance history.

The NSW Scientific Committee (2011) Final Determination for the *Semi-evergreen Vine Thicket* EEC provides a list of species associated with that TEC. The *Semi-evergreen Vine Thicket* Final Determination does not note that there are additional species other than those listed in the Final Determination, but instead refers to a published paper (Benson *et al*, 1996) for additional details. Benson *et al* (1996) only mention *Atalaya hemiglauca* being present in one community at Derra Derra Ridge and Planchonella Hill. Benson *et al* (1996) does not include *A. hemiglauca* in their list of commonly recorded plant species in their *Semi-evergreen Vine Thicket* community (Community 2), however, it is mentioned as being present in their 'Community 1' that occurs on the "... highest ridges that support a mid-high open woodland composed of *Eucalyptus albens*, *Eucalyptus dealbata* and *Callitris glaucophylla*" (Benson *et al*, 1996; page 501).

**Photograph 1: Condition Zone 1- Mostly dominated by native trees**

(a) Sample SSBP0000: - note the rocky areas including through *Geijera parviflora* canopy at the left. Areas dominated by *Atalaya hemiglauca* are shady and the ground-layer is protected in part from grazing by the rocks. This area will not be impacted by the proposal. (b) Sample SSBP0001: - This treed area to be disturbed is less species rich and has a lower cover of protective rocks. The rough bark of *Atalaya hemiglauca* is obvious.

(a)



(b)



**Photograph 2: Condition Zone 2- Mostly dominated by exotic grasses and/or forbs:**

(a) Sample SSBP0002: - This site has regenerating native trees (<5cm) but few in larger DBH cohorts; the dominance of grasses and forbs is obvious with the former predominately the invasive Buffel Grass (*Cenchrus ciliaris*). (b) Sample SSBP0003: -The dominant exotic Buffel Grass and Brassicaceae weeds are obvious at this site and the paucity of trees is apparent. None-the-less, native trees and habitat such as the large rock at the transect end were utilised by native fauna; the rock and shade of trees sheltered macropods and trees such as this were used by transient Zebra Finches (*Taeniopygia guttata*) for roosting.

(a)



(b)



*Semi-evergreen Vine Thicket* occurs in NSW and Queensland and the Commonwealth listing refers to the NSW Final Determination for the characterisation of the *Semi-evergreen Vine Thicket* as it occurs in NSW (Threatened Species Scientific Committee [TSSC], 2001). Similarly, the National Recovery Plan for *Semi-evergreen Vine Thicket* (McDonald, 2010) lists all the vegetation types after the Queensland Regional Ecosystems for the characterisation of that TEC in Queensland and refers to NSW published (e.g. Benson et al, 1996; Floyd, 1990) and unpublished works (e.g. Curran, 2003[sic]) on *Semi-evergreen Vine Thicket*. McDonald (2010) does not note the presence of *Atalaya hemiglauca*.

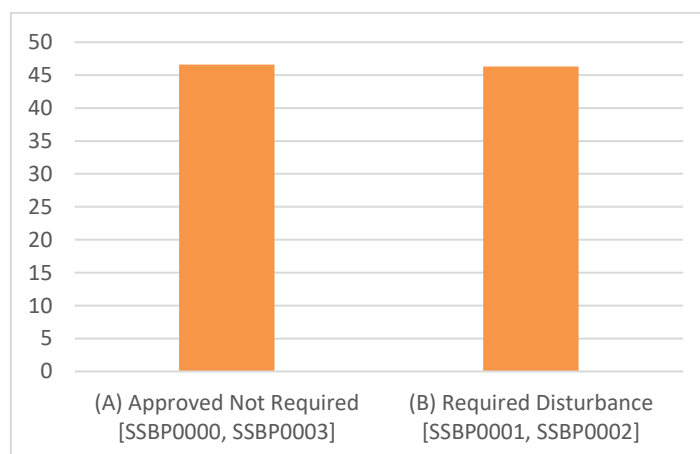
Based on the classifications outlined by the NSW Scientific Committee (2011), TSSC (2001) and McDonald (2010), the PCT 147 at the subject site is not part of the TEC listed under either NSW or Commonwealth legislation.

### 3.2 Vegetation Integrity Score

Zone 1 has much higher VI scores than the zone dominated by grasses and forbs (Zone 2) (Table 3-3). Zone 1A (Approved for Disturbance Not Required) had the highest score and Zone 2A (Approved for Disturbance Not Required) the lowest. Overall, there was no obvious difference in the combined Vegetation Integrity Scores between [A] areas that are approved for disturbance and not required to those that [B] will be disturbed to implement the drainage improvement works (Figure 3-3).

**Table 3-3: Vegetation Integrity Score generated from by BAM-C with BAM field data**

Sample strata	Sample site	Vegetation Integrity Score (BAM-C)
<b>Mostly dominated by native trees</b>		
A. Approved for Disturbance Not Required	SSBP0000	40.1
B. Additional Disturbance Required to Improve Drainage	SSBP0001	32.6
<b>Mostly dominated by exotic grasses and/or forbs</b>		
A. Approved for Disturbance Not Required	SSBP0003	6.5
B. Additional Disturbance Required to Improve Drainage	SSBP0002	13.7



**Figure 3-3: Comparison of combined Vegetation Integrity Scores between [A] Approved for Disturbance Not Required and [B] Additional Disturbance.**

### 3.3 Fauna Habitat

Data collected in the BAM (DPIE, 2020) plots included number of trees, diameter at breast height (DBH), coarse woody debris, leaf litter cover and data on tree hollows and these results are presented in Figures 3-4 to 3-7. Other habitat attributes that were qualitatively assessed in each plot are summarised in Table 4.

The habitat features observed on the subject site can be summarised as follows:

- Deficiency of tree hollows throughout (one small one, in Zone 1A);
- Mostly rough barked trees (cf smooth bark) with more specimens in Zone 1A;
- Lack of nectar resources;
- Lack of dense understorey;
- Greater number of trees in areas Approved for Disturbance Not Required than areas of Additional Disturbance;
- Some mature trees in Zone 1;
- Mistletoe present in treed habitats;
- More coarse woody debris in areas Approved for Disturbance Not Required than areas of Additional Disturbance (Figure 3.5);
- Leaf litter had a higher cover at treed sites than areas dominated by grasses and forbs (Figure 3.6);
- Leaf litter was highest in Zone 1B; however, a relatively high cover of rocks occupies ground cover space at the treed SSBP0000 than at the treed SSBP0001;
- More native tussock grasses were present in treed areas than areas dominated by grasses and forbs, as the latter was dominated by the invasive exotic Buffel Grass (*Cenchrus ciliaris*); and
- No aquatic habitats were present.

### 3.4 Fauna

No threatened species were observed during the site inspection.

All of the threatened fauna recorded in Gunnedah LGA (NSW DPIE, 2021e; appendix 3) were sorted into the following categories, based on their known habitats and the habitat recorded in the subject site:

1. Known near the subject site (seven species) (NSW DPIE, 2021e; Appendix 2);
2. Possible habitat and/or resources present (24 species) (NSW DPIE, 2021e; Appendix 3; Appendix 5); and
3. Unlikely to occur (17 species) (NSW DPIE, 2021e; Appendix 3, Appendix 5).

Consideration of threatened fauna in the biodiversity values assessment considered those in categories 1 and 2.

A total of 80 fauna species have been recorded at or near the subject site, including in the original fauna assessment (Mills 2008). Seven species of threatened fauna listed as Vulnerable under the BC Act have been recorded near the subject site or in the wider area (10 km x 10 km; DPIE, 2021d). Five of these were recorded by Mills (2008), although at that time, two species, the Little Lorikeet (*Glossopsitta pusilla*) and Little Eagle (*Hieraaetus morphnoides*) had not yet been listed. The other threatened species recorded by Mills (2008) included the Koala (*Phascolarctos cinereus*), Speckled Warbler (*Chthonicola saggittata*) and Grey-crowned Babbler (*Pomatostomus temporalis temporalis*), all listed as Vulnerable under the BC Act (see Figure 4.1). The Koala is also listed as Vulnerable under the EPBC Act.

The Spotted-tailed Quoll (*Dasyurus maculata*), listed as Endangered under the EPBC Act and Vulnerable under the BC Act, has one record in the vicinity of the subject site within the 10 km x 10 km BioNet search area (NSW DPIE, 2021d) (see Figure 4.1)

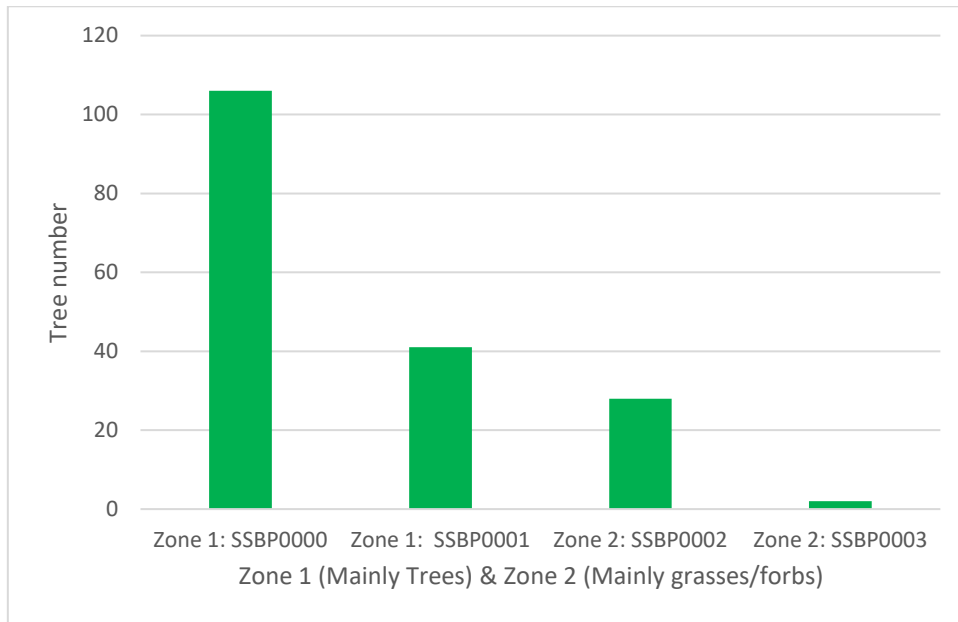


Figure 3-3: Number of trees by condition zone and sample site

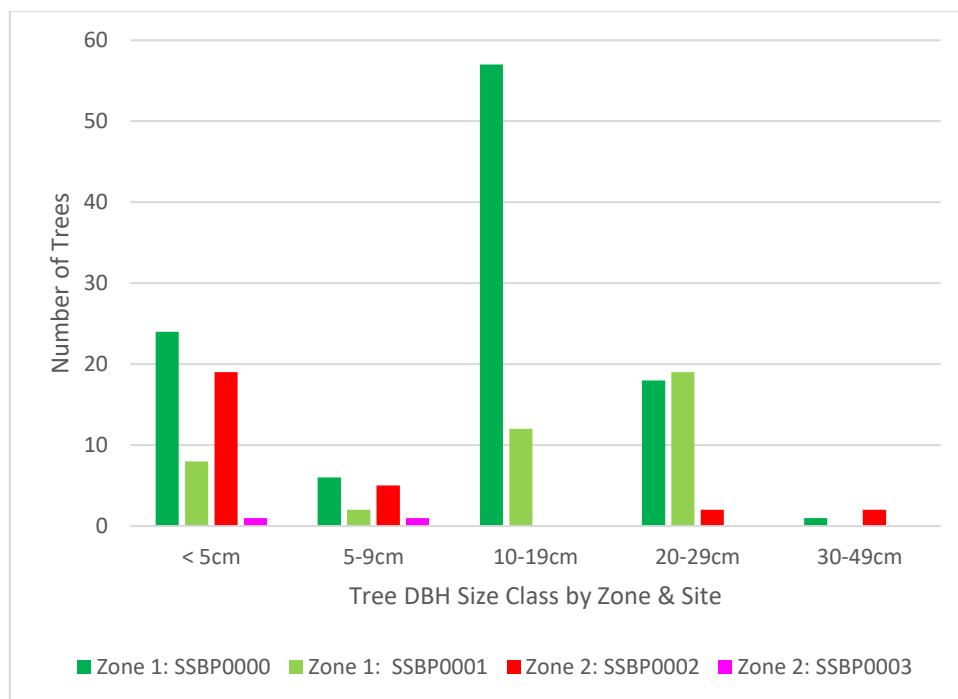


Figure 3-4: DBH by condition zone and sample site

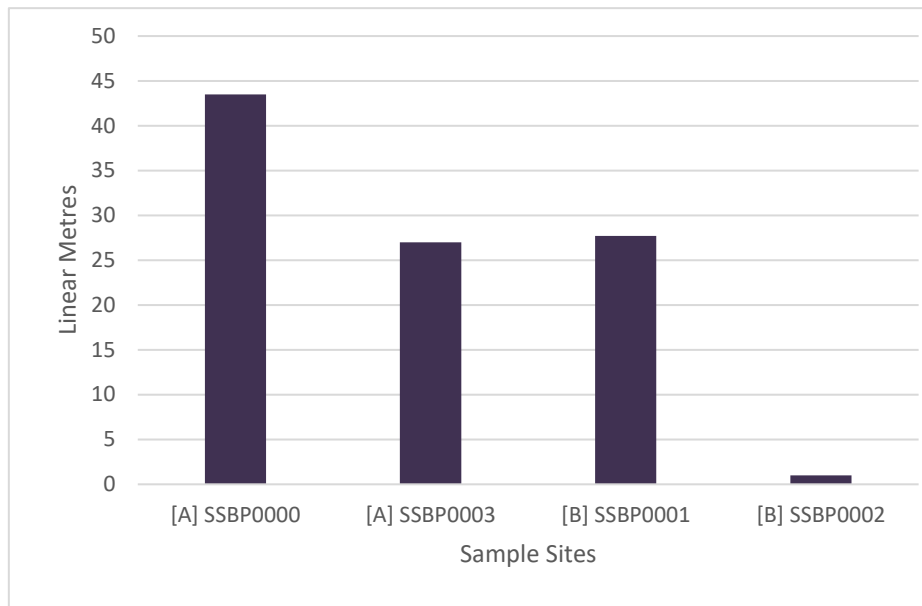


Figure 3-5: Course woody debris >10cm diameter & >50cm long recorded in 1000m<sup>2</sup> samples sites in areas [A] Approved for Disturbance Not Required and [B] Additional Disturbance

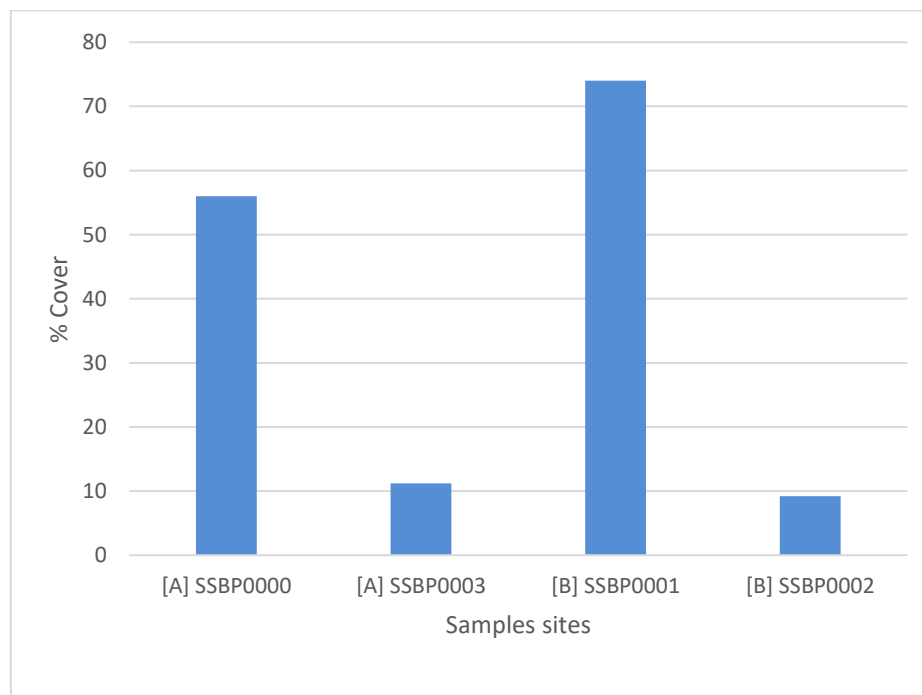


Figure 3-6: Average leaf litter cover recorded in 1000m<sup>2</sup> subsamples for areas [A] Approved for Disturbance Not Required and [B] Additional Disturbance

**Table 3-4: Qualitative fauna habitat assessment: Habitat attributes and their relative abundance by sample site [SSBP0000, SSBP0001, SSBP0002, SSBP0003]**

Abundance categories	Abundant	Common	Scattered	Rare	None	Comment
<b>Habitat Attribute</b>						
<b>Tree Feature</b>						
Large Hollows					None	
Small Hollows				SSBP0000		
Decorticating bark					None	
Bark Texture	SSBP0000 [Ah]	SSBP0001 [Ah]	SSBP0002 [Ah] SSBP0002 [Gp]	SSBP0000 [Aho][Gp] SSBP0001 [Gp] SSBP0003 [Ah] [Gp]		[Ah] <i>Atalaya hemiglauca</i> (rough & scaly)^ [Aho] <i>Acacia homalophylla</i> (thick & flaky)^ [Cm] <i>Capparis mitchellii</i> (quite rough) + [Gp] <i>Geijera parviflora</i> (becoming rough & longitudinally flaky)#,^
Old Growth					None	
<b>Shelter/Food Resources</b>						
Mistletoe			SSBP0000 SSBP0001			See appendix 1
<i>Allocasuarina</i>					None	
Nectar: trees						No Myrtaceae trees in subject site
Nectar: shrubs						No Myrtaceae, Ericaceae, Proteaceae, Rutaceae shrubs
Termitaria-ground					None	
Termitaria-arboreal					None	
Dense understorey					None	
<i>Acacia</i> spp present				SSBP0000		In 1000 m <sup>2</sup> transect
Cliff/outcrops/gorge					None	Nearby
Rocks: Med. to Large			SSBP0000	SSBP0003, SSBP0001		
Rocks: Small to surface		SSBP0000		SSBP0001		
Tussock Grasses		SSBP0000, SSBP0001	SSBP0002			Please note that the exotic <i>Cenchrus ciliaris</i> coarsely fits the habit but is not included in this appraisal as any ecological restoration management would remove this invasive species
<b>Abundance Category description</b>	<i>Conspicuous, unavoidable</i>	<i>Obvious, not overwhelming</i>	<i>Few here &amp; there but need to search</i>	<i>Virtually none; 1 or 2 in dedicated search</i>	<i>Not found in dedicated search</i>	# Generally small specimens providing limited resources *Cunningham <i>et al</i> (1981) ^Harden <i>et al</i> , (2016)

## 4 Assessment of Impacts on Biodiversity Values

The “biodiversity values” to be assessed are those identified by the NSW *Biodiversity Conservation Act 2016* (BC Act) and the NSW *Biodiversity Conservation Regulation 2017* (BC Regulation) and listed in Table 1-1.

### 4.1 Vegetation Abundance

The Modification would overall result in the clearance of 0.09 ha of woody vegetation classified as PCT 147 compared to 0.08 ha originally approved to be cleared. However, the native vegetation to be retained under the modification is in better condition than the native vegetation that would be lost.

It was noted that the subject site comprised a narrow band at the edge of a wider remnant of PCT 147 which incorporates all the woody vegetation between Zone 1 and upslope to the Koala fence. Thus, the proposed clearance would not homogenise and simplify the ecological landscape as there is similar and/or better quality habitat directly adjacent to the subject site that will be retained.

### 4.2 Vegetation Integrity

Prior to the mine development and latter rehabilitation the subject site was extensively modified due to clearing and exploiting natural resources for agricultural use (see Figure 4.2. for landscape setting showing the heavily modified landscape beyond the previous mine footprint). The historical clearing has likely had a significant impact on the structure, function and composition (after Noss, 1990) of the subject site. For example, the shift from historically expected woodland vegetation across the landscape to cropland and pastureland community is an obvious structural (trees to grasses) and composition (native woody species to exotic crops and pasture species) shift in the landscape (see Cunningham [2007] figure 2 and 5). The legacy of this historical agricultural development has undoubtedly affected the vegetation integrity of the subject site.

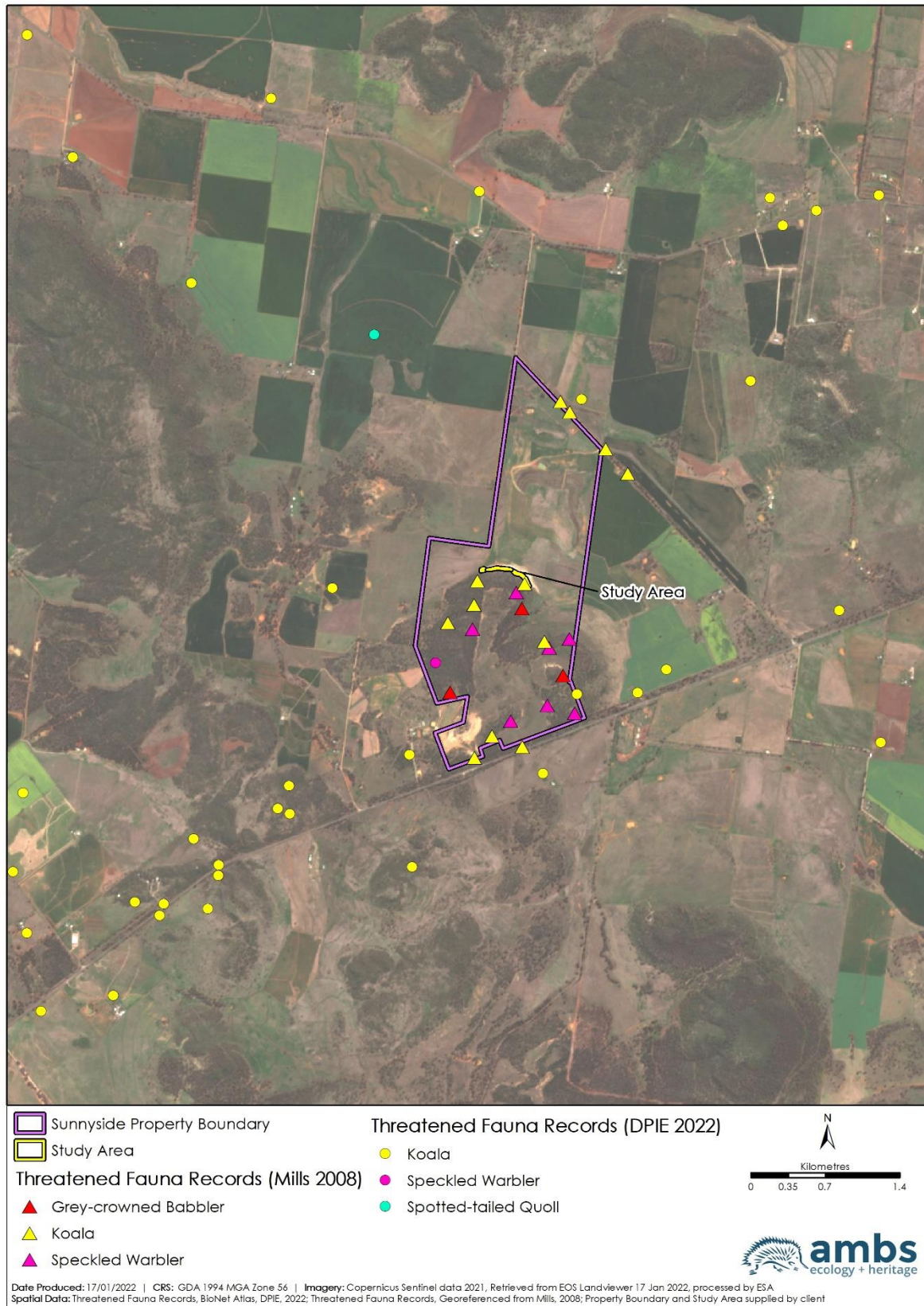
The vegetation integrity score for PCT 147 was higher for the Approved Disturbance Not Required (i.e. 40.1) compared to the Additional Disturbance area (i.e. 32.6), indicating that the area of native vegetation to be retained under the modification was in better condition than that proposed to be removed.

This is consistent with the results that indicate that PCT 147 in the Approved Disturbance Not Required (Zone 1A) contains better quality habitat than the remainder of the subject site, including:

- Highest native species richness;
- Lowest weed species richness;
- Lowest cover of invasive species (i.e. Buffel Grass);
- The most coarse woody debris;
- Largest number of trees; and
- The only recorded hollow (albeit a small one)(Table 3.4.).

### 4.3 Habitat Suitability

The biodiversity values assessment (table 1.1.) requires an assessment of habitat suitability for threatened fauna known in the study area or vicinity as evaluated previously (section 3.5; appendix 2 to 5). The following subsections provides an expanded outline of the threatened fauna habitat suitability.



**Figure 4.1: Threatened species near the subject site** (source: Mills, 2008; DPIE, 2022) NB: Please see Appendix 2 for additional species in an expanded area (10km x 10km) around subject site

#### 4.3.1 Border Thick-tailed Gecko

Border Thick-tailed Gecko (*Uvidicolus sphyurus*) habitat includes steep, rocky or scree slopes, especially granite country but also on basalts and metasediments slopes and flats that includes areas that had been cleared for agriculture; recent records suggest its habitat selection is broader than previously thought (DPIE, 2021c). Suitable habitat includes sites with fallen timber, boulders and rock slabs in forest and woodland (DPIE, 2021c). The proposed modification will not disturb the area of potential microhabitat on the subject site; the rocky area in Zone 1A (SSBP0000).

#### 4.3.2 Pink-tailed Legless Lizard

Within the Gunnedah region, known habitat for the Pink-tailed Legless Lizard (*Aprasia parapulchella*) includes White Box-Blakely's Red Gum and Weeping Myall Woodland in a natural clearing where lateritic surface rocks are also present; the ground cover is sparse and consists of native pasture species and weeds (Wong *et al*, 2011). This woodland habitat is absent from the subject site, however, the modification will still avoid the rocky area in Zone 1A (SSBP0000), which is considered as the most likely potential microhabitat for this species.

#### 4.3.3 Spotted-tailed Quoll

The Spotted-tailed Quoll has a record near the subject site but the date of the sighting is unknown. It seems that that location was farmland prior to the mine (see Cunningham, 2007, their figures 2 & 5) but it could have been an older pre-clearing for farmland collection or record. Spotted-tailed Quolls have a wide range of habitats including rainforest, open forest, heathlands and woodlands and are found at low to high altitudes (Dickman & Ganff, 2007).

The solitary mammals den individually in rock crevices, tree hollows and logs during the day and are nocturnal hunters (Dickman & Ganff, 2007). Spotted-tailed Quolls have a relatively large home range, although size varies with female territory spacing (180 to 1,000 ha) and habitat richness (Belcher *et al*, 2008). Males are not territorial, and their home range is between 2000 – 500 ha and may overlap other males and a number of females (Belcher *et al*, 2008). Their diet includes invertebrates, reptiles, birds, mammals and carrion; juveniles consume more invertebrates, birds and small mammals, while in contrast 70% of adults' diets comprise medium sized mammals such as bandicoots, rabbits, possums and small macropods (Belcher *et al*, 2008).

With such large home ranges and territories coupled with the larger extent of habitat nearby (e.g. rocky areas, woodlands) it is possible that the subject site may be within the home range of Spotted-tailed Quolls persisting in the local landscape. However, the proposed clearance of the small Zone 1B wooded habitat area (0.09 ha) would be insignificant and not likely to impact any Spotted-tailed Quolls. The more heterogenous habitat wooded area in Zone 1A (SSBP0000) that is no longer proposed to be disturbed would provide potential habitat for this species, if present.

#### 4.3.4 Koala

Koalas utilize trees for food and shelter (Ellis *et al*, 2002; Matthews *et al*, 2007) and near the subject site Mills (2008) recorded a number of Koalas associated with the following tree species:

- *Eucalyptus albens* (5 records);
- *Geijera parviflora* (3 records);
- *Eucalyptus dealbata* (2 records);
- *Eucalyptus melliodora* (1 record); and
- *Alphitonia excelsa* (1 record).

The three *Eucalyptus* species are known dietary species but *G. parviflora* and *A. excelsa*, as suggested by Mills (2008), are shelter trees; also see NSW OEH (2018) that lists these, and many more food trees and other local occurring species utilised as shelter (e.g. *Brachychiton populneus*). An existing koala fence separates the subject site from locations to the south where Koalas have been recorded by Mills (2008) and more recently by AMBS (2021).

There are no feed trees at the subject site. There are potentially some shelter trees; however, the dominant tree *Atalaya hemiglauca* is not recognised in the NSW OEH (2018) review of food and shelter trees associated with Koalas. The removal of the trees in the proposed modification area to be disturbed will not affect any Koala individual that may utilise the subject site even if they skirt the Koala fence that is barrier to their movement from adjacent to the subject site; additionally, there are more *A. hemiglauca* mature trees and higher density (thus more shelter) in the Zone 1A patch (SSB000) in the Approved Disturbance Not Required, as well as additional specimens upslope from the subject site but downslope from the Koala fence.

#### 4.3.5 Microchiropteran Bats

All of the Microchiroptera with possible habitat at the subject site are insectivores and depending on their biology and ecophysiology they may forage in, through, above or at the edge of wooded habitats (see Churchill, 2008; Law *et al*, 2018). It is not expected that the removal of the trees at the extant edge of the treed vegetation (SSBP0001) will negatively affect the foraging resources of any potential Microchiroptera that may utilise that habitat as the edge habitat will still exist.

The Microchiroptera that potentially utilise the subject site include species that use either or both tree-based resources or rock derived niches as their roosting and/or breeding habitats. Some of the taxa also utilise artificial habitats such as old mine shafts or buildings for roosting and breeding (Churchill, 2008), but these do not occur anywhere within the subject site and are not relevant to this assessment.

The 'natural' roosting and/breeding habitats for each species include:

1. Tree-derived habitat resources (e.g. hollows, behind bark) used as shelter and/or breeding by the: Yellow-bellied Sheath-tail-bat (*Saccolaimus flaviventris*), Eastern Coastal Free-tailed Bat (*Micronomus norfolkensis*), Hoary Wattled Bat (*Chalinolobus nigrogriseus*), Little Pied Bat (*Chalinolobus picatus*) (Churchill, 2008); and Corben's Long-eared Bat (*Nyctophilus corbeni*) (Law *et al*, 2018); and
2. Caves, rock crevices and overhangs used for shelter and/or breeding by the: Hoary Wattled Bat (*Chalinolobus nigrogriseus*) (Occasionally); Large-eared Pied Bat (*Chalinolobus dwyeri*), Little Pied Bat (*Chalinolobus picatus*), Eastern Cave Bat (*Vespadelus troughtoni*) and Large Bent-winged Bat (*Miniopterus orianae oceanensis*) (Churchill, 2008).

There is a paucity of hollows as more than half the subject site area is dominated by Zone 2 grasses and forbs (Figure 3.4.) with less trees that have potential to form small hollows. *Atalaya hemiglauca* doesn't develop hollows due to the small diameter of its trunk. The one hollow recorded on site is to be retained in Zone 1A. The rocky area in Zone 1A does not have any caves, rock crevices and overhangs that would function as Microchiroptera shelter and/or breeding habitat.

In summary, the areas affected by the proposed modification do not have functioning roosting or breeding habitat nor will the removal of the 0.09 ha of PCT 147 affect the foraging opportunities for any Microchiroptera that may currently utilise the habitat.

#### 4.3.6 Avifauna (birds)

Twenty species of threatened birds that were deemed to have possible habitat resources at the subject site have been assessed (Appendix 3, 5). In summary, the modification is not expected to cause a greater impact on any of these species due to the lack of resources on the subject site (e.g. no hollows; no nectar sources; vegetation structure), the small area impacted, and the presence of nearby and adjacent areas with better quality habitats.

### 4.4 Threatened species abundance

No threatened species were recorded at the subject site and any possible threatened fauna that may utilise the habitat would have limited resources available (e.g. invertebrate habitat as vertebrate prey items) as the entire subject site lacks key habitat resources, is relatively small, and the area proposed to be impacted is even smaller. The dominant tree, *Atalaya hemiglauca*, is not a large tree species and seemingly not conducive to hollow development, useful to many threatened species.

The native vegetation present is not a threatened ecological community.

### 4.5 Habitat connectivity

The subject site is at the northern end boundary of a relatively extensive area of mosaic woody remnant vegetation and at the southern end of the old mine workings. As a result of historical disturbance from agriculture, clearing of vegetation (see Cunningham, 2007, their figure 2) and the more recent mine development and closure, non-woody vegetation dominates the area north of the subject site and there is a lack of habitat connectivity between woody vegetated areas across the landscape (Figure 4-2). The extant Koala fence is a current barrier between the vegetation to the south of the subject site and areas north (see Figure 1-1).

The rehabilitated mine site is currently dominated by grass species. Proposed plans (WHC, 2017b, their figure 3) aim to improve connectivity and this will not be impacted by the proposed modification.

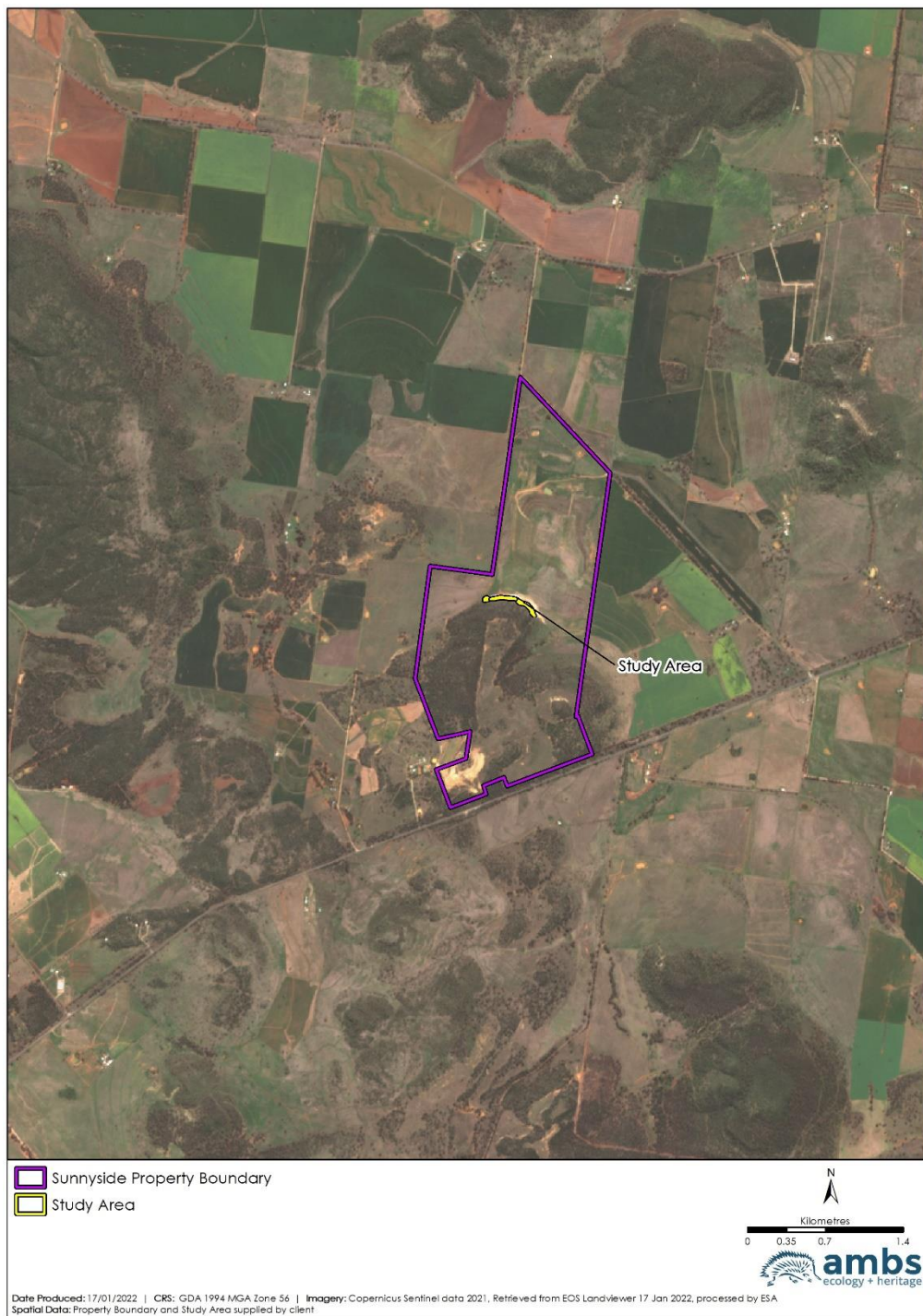


Figure 4-2: The landscape setting of the subject site

#### 4.5.1 Avifauna

Twenty species of threatened birds that were deemed to have possible habitat resources at the subject site have been assessed (Appendix 3, 5). In summary, the modification is not expected to cause a greater impact on any of these species due to the lack of resources on the subject site (e.g. no hollows; no nectar sources; vegetation structure), the small area impacted, and the presence of nearby and adjacent areas with better quality habitats.

### 4.6 Threatened species abundance

No threatened fauna species were recorded at the subject site and the entire subject site lacks key habitat resources, is relatively small, and the area proposed to be impacted is even smaller. The dominant tree, *Atalaya hemiglauca*, is not a large tree species and seemingly not conducive to hollow development, useful to many threatened species.

The native vegetation present is not a threatened ecological community.

### 4.7 Habitat connectivity

The subject site is at the northern boundary of a relatively extensive area of mosaic woody remnant vegetation and at the southern end of the old mine workings. As a result of historical disturbance from agriculture, clearing of vegetation (see Cunningham, 2007, their figure 2) and the more recent mine development and closure, non-woody vegetation dominates the area north of the subject site and there is a lack of habitat connectivity between woody vegetated areas across the landscape (Figure 4-2). The extant Koala fence is a current barrier between the vegetation to the south of the subject site and areas north (see Figure 1-1).

The rehabilitated mine site is currently dominated by grass species. Proposed plans (WHC, 2017b, their figure 3) aim to improve connectivity and this will not be impacted by the proposed modification.

### 4.8 Threatened species movement

As discussed in Section 4.5, the extant Koala fence is a partial barrier to movement of non-flying fauna. Proposed plans (WHC, 2017b, their figure 3) will improve connectivity and the movement of species will not be altered by the proposed clearance of a narrow strip of vegetation bordering the larger remnant woodland associated with the modification.

### 4.9 Flight path integrity

The proposed works, comprising a low berm to direct surface water runoff, will not create a movement barrier or affect the flight path integrity for any winged species that are potentially present, including threatened fauna species.

### 4.10 Water sustainability

The proposed works are to improve drainage to accommodate a 1 in 100-year storm event to lower the risk of erosion of the extant highwall; this will lower the risk of sedimentation and associated turbidity of downstream catchments. It should also be noted that all proposed works are downslope from extant habitats to the south and the drainage works will not affect surface flow in those habitats.

## 4.9. Biodiversity Values Conclusion

The vegetation abundance as measured by area is slightly less by 0.01ha in the wooded (PCT147) remnant areas to be retained (SSBP0000) than that to be cleared (SSBP0001) but in other measures of abundance such as the number of trees (see Zone 1 in Figures 3.3. & 3.4) and likely biomass (as indicated by tree number by DBH size class)(Figure 3.4) is measurably more in the area to be retained than cleared. Though the total overall vegetation integrity scores are similar between areas to be retained and those to be cleared (section 3.3.) it is apparent that the woody PCT 147 remnant to be retained has a higher Vegetation Integrity score as calculated using BAM-C (table 3.3.)

Most but not all habitat attributes measured during the field work using the BAM method indicates clearly that there are more habitat features in the woody remnant habitat areas to be retained (SSBP0000) than cleared (SSBP0001)(Figures 3-4 to 3-7, table 3.4.). The habitats that are mostly dominated by native trees has been classed as PCT147 and though it does provide fauna habitat a detailed appraisal of threatened fauna in the locality (section 3.5.) exposes that the habitat attributes utilised by threatened fauna are poorly provided by the vegetation resources of PCT147 (e.g. nectar, hollows, tree size) or in low abundance (e.g. mistletoe).

Additionally, the area to be cleared is quite small and at the edge of a larger remnant (adjacent to subject site) that interfaces with the cleared landscape matrix and its removal will not affect habitat connectivity, threatened species movement including the flight path integrity of any winged vertebrate. Finally, there are no aquatic habitats (e.g. creeks, wetlands) in the subject site and the proposed works intent is to restrict run-off on unstable sediments and the likelihood of erosion and increasing turbidity in lower catchment.

## 5 Matters of National Environmental Significance

As the proposed works includes undertaking 'actions' (after DEH, 2013; pg2) the scope of works required a Matter of National Environmental Significance (MNES). A protected matters search was completed but no targeted field survey for fauna was undertaken. A detailed assessment of habitat suitability for threatened and migratory fauna known in the study area, vicinity or Gunnedah LGA was evaluated (section 3.5; appendix 2 to 5) and was considered a thorough appraisal to inform the MNES.

The following section provide a MNES for targeted fauna as guided by DEH (2013).

### 5.1.1 Threatened Species: Critically Endangered and Endangered Species

The Spotted-tailed Quoll (*Dasyurus maculatus*) is listed as Endangered under the EPBC Act as it has been recorded near the subject site (Figure 3). In order to determine if a significant impact is likely to occur to endangered species, it has been considered whether the modification will:

- **lead to a long-term decrease in the size of a population**

The proposed modification will not affect the size of a Spotted-tailed Quoll population (if present) as the area of habitat removed is extremely small (0.09 ha) and there is more extensive habitat nearby.

- **reduce the area of occupancy of the species**

The proposed modification will not affect the area of occupancy of any Spotted-tailed Quoll population (if present) as the area of habitat removed is extremely small (0.09 ha) and there is more extensive habitat nearby.

- **fragment an existing population into two or more populations**

The subject site is not situated between areas of important habitat and as such, the clearance of 0.09 ha of vegetation will not restrict the movement of the species across its wide range. The vegetation clearance associated with the modification will not cause the fragmentation of potential existing populations.

➤ **adversely affect habitat critical to the survival of a species**

The territories of Spotted-tailed Quolls are quite large and the area of habitat proposed to be removed is not considered critical habitat and is extremely small (0.09 ha); furthermore, there is more extensive and better quality habitat nearby that is more likely to be utilised by the Spotted-tailed Quoll, if present. Therefore, the modification will not adversely affect critical habitat of this species.

➤ **disrupt the breeding cycle of a population:**

The proposed impacts are minimal, localised and avoid the disturbance of high-quality habitat, thus it is unlikely that the Spotted-tailed Quoll's breeding cycle will be disrupted due to habitat disruption during a crucial life stage.

➤ **modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline**

The modification will not remove habitat that is critical to the survival of the current population, especially since the area to be cleared is small (0.09 ha) and more suitable habitat is available in the locality (within the potential range of the Spotted-tailed Quoll).

➤ **result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat**

The habitat of the subject site is at the edge of wooded remnants in a landscape mosaic of grassland (farmland and old mine site) and remnant woodlands. Feral predator species have been recorded locally and undoubtedly range over the extant landscape mosaic including edge environments; the proposed modification will not facilitate or enhance invasive species habitat to increase opportunities for feral predators whose territory may encompass the subject site. Furthermore, WHC are undertaking pest vertebrate control in the vegetated habitats south of the subject area.

➤ **introduce disease that may cause the species to decline, or**

No disease will be introduced to impact the marsupial Spotted-tailed Quolls.

➤ **interfere with the recovery of the species**

No Spotted-tailed Quolls recovery actions will be interfered with in these proposed works to ameliorate and improve drainage function.

### 5.1.2 Threatened Species: Vulnerable Species

The following species are listed as vulnerable under the EPBC Act and are known to occur near the subject site or have possible habitat on the subject site:

- Koala (*Phascolarctos cinereus*) (recorded nearby);
- Large-eared Pied Bat (*Chalinolobus dwyeri*) (possible foraging habitat);
- Corben's Long-eared Bat (*Nyctophilus corbeni*) (possible foraging habitat);
- Border Thick-tailed Gecko (*Uvidicolus sphyurus*) (potential with rocky habitat present);
- Pink-tailed Legless Lizard (*Aprasia parapulchella*) (potential with rocky habitat but not suitable macrohabitat [vegetation and geology type]); and

- Painted Honeyeater (*Grantiella picta*) (possible habitat).

In order to determine if a significant impact is likely to occur to any of these threatened species as a result of the proposed modification, it has been considered whether the modification will:

- **lead to a long-term decrease in the size of an important population of a species**

It is not expected that any threatened species whose population may utilise the subject site will experience population decline due to the proposed modification. The most likely usable habitat (rocky ground strata) at the subject site (SSBP0000) for species such as the Pink-tailed Legless Lizard and Border Thick-tailed Gecko would not be disturbed.

- **reduce the area of and occupancy of an important population**

The subject site is not likely to support any threatened species due the lack of habitat resources present, and it is unlikely that the loss of a small area (0.09 ha) bordering an area of extant woody habitat will impact the area of occupancy of those species.

- **fragment an existing important population into two or more populations**

The subject site is not situated between areas of important habitat, and the clearance of 0.09 ha of vegetation will not restrict the movement of any species between areas of remnant vegetation. The vegetation clearance associated with the modification will not cause the fragmentation of potential existing populations.

- **adversely affect habitat critical to the survival of a species**

No habitat to be impacted would be considered critical for any threatened species.

- **disrupt the breeding cycle of an important population**

The proposed impacts are minimal, localised and avoid the disturbance of high-quality habitat, thus it is unlikely that the breeding cycle of any threatened species will be disrupted due to habitat disruption during a crucial life stage.

- **modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline**

The area of habitat removed is extremely small (0.09 ha) and it is not critical habitat for any threatened species; furthermore, there is more extensive habitat better quality nearby. The modification will not remove habitat that is considered to be critical to the survival of any threatened species, especially since the area to be cleared is small (0.09 ha) and more extensive areas of suitable habitat are available in the locality.

- **result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat**

The habitat of the subject site is at the edge of wooded remnants in a landscape mosaic of grassland (farmland and old mine site) and remnant woodlands. Feral predator species have already been recorded locally and undoubtedly range over the extant landscape mosaic including edge environments; the proposed modification will not facilitate or enhance invasive species habitat to increase opportunities for feral predators to kill any threatened species whose territory or opportunistic resource exploitation may encompass the subject site. Furthermore, WHC are undertaking pest vertebrate control in the vegetated habitats south of the subject area.

**Table 5-1: Listed Migratory Species recorded in the Gunnedah LGA**

Species	Comm. Status*	Records	Habitat
Fork-tailed Swift <i>Apus pacificus</i>	C,J,K	5	Almost exclusively aerial (< 1 m asl to considerable heights, at least 300 m asl) mostly over inland plains but sometimes foothills and coastal areas (Higgins, 1999)
White-throated Needletail <i>Hirundapus caudacutus</i>	C,J,K	9	Almost exclusively aerial (< 1 m asl to > 1000 m asl); occur over most habitats more often over wooded areas (Higgins, 1999)
Latham's Snipe <i>Gallinago hardwickii</i>	J,K	2	<b>Not suitable habitat:</b> Uses wide variety of permanent & ephemeral wetlands (Higgins & Davies, 1996)
Black-tailed Godwit <i>Limosa limosa</i>	C,J,K	P	<b>Not suitable habitat:</b> Mainly coastal, usually sheltered bays, estuaries lagoons with large intertidal mudflats, sandflats, occasionally rocky coasts (Higgins & Davies, 1996)
Common Greenshank <i>Tringa nebularia</i>	C,J,K	1	<b>Not suitable habitat:</b> Wide variety of inland wetlands and sheltered coastal habitats of varying salinity (large mudflats, saltmarsh, mangroves, river estuaries, lagoons), swamps & lagoons, particularly those with mudflats, sometime inundated ground include saltpans, claypans & saltmarsh (Higgins & Davies, 1996)
Caspian Tern <i>Hydroprogne caspia</i>	J	2	<b>Not suitable habitat:</b> Prefer shallow, often ephemeral, terrestrial wetlands, either fresh or saline, especially saline, especially lakes (Higgins & Davies, 1996)

\* Commonwealth status under the EPBC Act.

- **introduce disease that may cause the species to decline, or**

No disease will be introduced to impact the threatened species or their habitat.

- **interfere substantially with the recovery of the species.**

No threatened species recovery actions will be interfered with in these proposed works to ameliorate and improve drainage function.

### 5.1.3 Listed Migratory Species

There are six listed migratory species recorded in the Gunnedah LGA (Table 5-1). Four of these species do not have suitable habitat at the subject site as they are associated with wetland habitats in Australia. Two species (Fork-tailed Swift and White-throated Needletail) are largely aerial and it is unlikely they will be impacted. Regardless, it has been considered whether the modification will:

- **substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species**

The area proposed to be cleared does not contain important habitat values for these species and is not likely to provide a significant foraging resource. The modification will not cause fragmentation of existing habitat or alter fire regimes or nutrient cycles. The intended alteration of surface water flow will result in reduced risk of erosion, sedimentation and pollution of water downstream throughout the catchment. Therefore, the loss of this small area of vegetation will have a negligible impact on the availability of habitat across the landscape for wide-ranging migratory bird species.

- **result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or**

No invasive species are recognised as a threat to the White-throated Needletails in Australia, however there is a record of Fork-tailed Swifts being killed by cats (Higgins, 1999). The modification would not facilitate the establishment of invasive species or populations on the subject site and WHC are undertaking pest vertebrate control in the adjacent areas of habitat.

- **seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.**

These species do not breed in Australia (Higgins, 1999). The loss of a such a small area of vegetation will have a negligible impact on these migratory species and will not disrupt their behaviour at any life stage.

## 5.1 Conclusion

The very small area (0.09ha) of wooded habitat to be cleared at the edge of a more extensive treed (including adjacent to the subject site) habitat and the developed landscape matrix will have negligible impacts on any biota or habitat assessed under MNES. Additionally, the habitat attributes utilised by biota under MNES consideration are poorly provided by the vegetation resources of PCT147 (e.g. nectar, hollows, tree size), are in low abundance (e.g. mistletoe) or not provided at all (e.g. aquatic habitats).

## 6 State Environmental Planning Policy (Koala Habitat Protection) 2021

The subject site is zoned RU1 (Primary Production) and according to SEPP (Koala Habitat Protection) 2021 list of applicable LGA identifies Gunnedah LGA that this zone land does not apply and that SEPP (Koala Habitat Protection) 2020 applies. The subject site does not have any trees that are recognised as Koala use trees listed in Schedule 2 of SEPP 2020 and is not core Koala habitat. Incidentally the subject site does not include any trees in the expanded list of Schedule 2 Koala use species in SEPP (Koala Habitat Protection) 2021.

The likely and potential impacts of the development on Koalas or Koala habitat is negligible.

There are no feed trees at the subject site. There are potentially some shelter trees, however the dominant tree *Atalaya hemiglauca* is not recognised in NSW OEH (2018) review of food and shelter trees associated with Koalas. The removal of the trees in the proposed modification area to be disturbed will not affect any Koala individual that may utilise the subject site even if they skirt the Koala fence that is currently a barrier to their movement from adjacent to the subject site; additionally, there are more *A. hemiglauca* mature trees and higher density (thus more shelter) in the Zone 1A area of Approved Disturbance Not Required, as well as additional specimens on the slope between the subject site and the extant Koala fence.

WHC (2017b) have developed a Koala Management Plan that includes the subject site that will protect 112ha of extant Koala habitat but also improve landscape connectivity by planting Koala food trees on the western and eastern boundaries of the Sunnyside Mine property where the former boundary will have planted 9.8 hectares and 9.00 hectares on the latter (WHC, 2017b, pg7).

## 7 Conclusion

The construction of the proposed modified surface water drain will involve the clearance of some remnant native vegetation (PCT 147) and exotic grassland at the edge of the existing access track.

To determine whether the clearance of the additional disturbance area was comparable to the existing approved area to be retained, and therefore whether the modification would result in increased impacts to biodiversity values, AMBS has completed a biodiversity assessment of the vegetation, fauna habitat and threatened species present on the subject site, in accordance with the BAM (DPIE, 2020).

The assessment found that the Additional Disturbance areas include 0.09 ha of disturbed PCT 147 and 0.06 ha of grassland and forbland dominated by exotic species, while the Approved Disturbance Not Required contains 0.08 ha of PCT 147 and 0.24 ha of grassland and forbland dominated by exotic species. The BAM-C output found that the overall vegetation integrity score for both areas were similar; however, the highest vegetation integrity scores and greatest habitat values were contained in the Approved Disturbance Not Required area (Zone 1A) and will therefore be protected as a result of the modification.

A detailed review of fauna information and habitat data concludes that there is negligible to no impacts on listed threatened species known near the subject or in the wider area, largely because the habitat type to be removed is small in area, and is lacking key resources compared to other woody habitat types nearby; e.g. there are no Eucalypt species and thus no nectar food source, and the small tree species present do not have a propensity for hollow development.

The conclusion of this assessment is that the proposed modification would not increase impacts on the biodiversity values of the subject site, on the basis that the size of the area of native vegetation to be removed (0.09 ha) is similar to the size of the area of native vegetation to be retained (0.08 ha) and the area of native vegetation to be retained contains the best condition habitat within the subject site.

The very small area (0.09ha) of wooded habitat to be cleared at the edge of a more extensive treed (including adjacent to the subject site) habitat and the developed landscape matrix will have negligible impacts on any biota or habitat assessed under MNES. Additionally, the habitat attributes utilised by biota under MNES consideration are poorly provided by the vegetation resources of PCT147 (e.g. nectar, hollows, tree size), are in low abundance (e.g. mistletoe) or not provided at all (e.g. aquatic habitats). SEPP (Koala Habitat Protection) 2020 applies to the subject site but the likely and potential impacts of the development on Koalas or Koala habitat is negligible due to the lack of Koala habitat (food or shelter) trees.

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## **Appendix 1: Vascular plant species by vegetation zone and % cover and abundance in [400m<sup>2</sup>] sample**

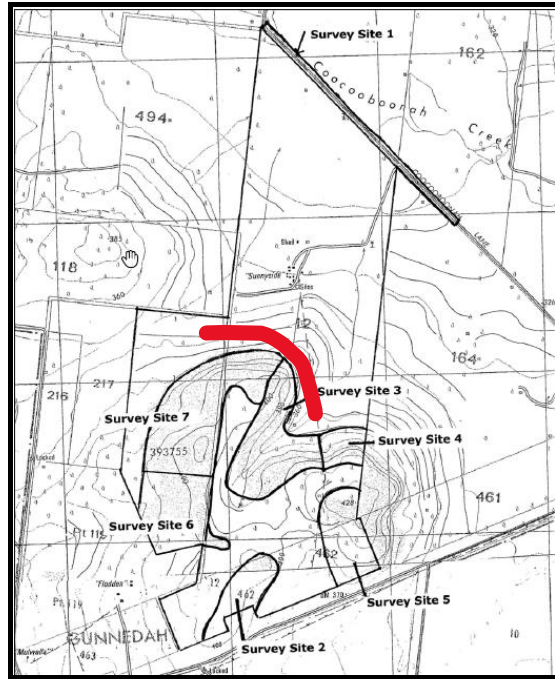
(\* denotes exotic species)

Zone	Mainly dominated by trees				Mainly dominated by grasses & forbs			
	1A: SSBP0000		1B: 1BSSBP0001		2B: SSBP0002		2A: SSBP0003	
	% cover	Abundance	% cover	Abundance	% cover	Abundance	% cover	Abundance
<i>Abutilon oxycarpum</i>	0.2	20	1	250	0.2	40	0.1	20
<i>Ancistrachne uncinulata</i>			0.01	1				
<i>Atalaya hemiglauca</i>	20	40	15	20	5	10	2	1
<i>Austrostipa scabra</i>	1	100	0.5	30	0.05	5		
<i>Austrostipa verticillata</i>	0.5	15	0.5	15	0.1	5		
<i>Brunoniella australis</i>							0.01	3
<i>Buglossoides arvensis*</i>							0.01	1
<i>Calotis lappulacea</i>	0.1	6	0.01	3				
<i>Capparis mitchellii</i>	0.3	3	0.7	1				
<i>Capsella bursa-pastoris*</i>							0.01	1
<i>Cenchrus ciliaris*</i>	0.2	10	20	500	35	1000	50	1000
<i>Clematis microphylla</i>	0.1	8						
<i>Conyza spp.*</i>					0.02	20	0.01	15
<i>Cotula australis</i>					0.01	1		
<i>Crassula sieberiana</i>					0.01	20		
<i>Croton phebalioides</i>	0.5	4						
<i>Dendrophthoe glabrescens</i>	0.01	5						
<i>Denhamia cunninghamii</i>	0.2	2						
<i>Dichondra repens</i>					0.01	10		
<i>Digitaria diffusa</i>	0.5	45						
<i>Ehretia membranifolia</i>			1	1			2	2
<i>Einadia hastata</i>	1	250						
<i>Einadia polygonoides</i>	0.2	40	0.4	30	0.1	20	0.01	3
<i>Einadia spp.</i>			0.5	15	0.2	20		
<i>Einadia trigonos</i>			3	500	0.5	100	0.2	30
<i>Eremophila mitchellii</i>	1	8						
<i>Geijera parviflora</i>	0.3	1	0.1	5	0.1	1	0.7	1
<i>Jasminum lineare</i>	0.2	30	0.1	5	0.1	3	0.1	1
<i>Lepidium africanum*</i>	0.1	15			0.01	5		
<i>Lysiana subfalcata</i>			0.3	15				
<i>Lysimachia arvensis*</i>					0.05	20	0.01	3
<i>Maireana enchylaenoides</i>					0.01	1		
<i>Malva parviflora*</i>			0.02	10			0.01	5
<i>Medicago laciniata*</i>					0.3	40	0.1	100
<i>Medicago minima*</i>					0.3	50		
<i>Medicago spp.*</i>					0.2	40		
<i>Myoporum montanum</i>	0.3	10	0.6	6	0.5	5	0.2	2

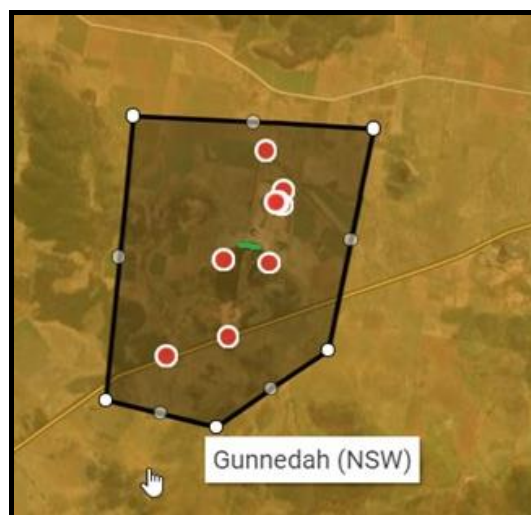
Zone	Mainly dominated by trees				Mainly dominated by grasses & forbs			
	1A: SSBP0000		1B: 1BSSBP0001		2B: SSBP0002		2A: SSBP0003	
	% cover	Abundance	% cover	Abundance	% cover	Abundance	% cover	Abundance
<i>Nicotiana suaveolens</i>			0.01	3	0.01	3	0.01	2
<i>Opuntia stricta</i> *	0.01	1						
<i>Oxalis thompsoniae</i>			0.01	1	0.01	1	0.01	2
<i>Parsonsia eucalyptophylla</i>	0.1	6	0.02	3				
<i>Parsonsia lanceolata</i>			0.01	3				
<i>Paspalidium gracile</i>			0.01	5				
<i>Pimelea neo-anglica</i>	0.1	5						
<i>Plantago spp.</i>					0.01	2		
<i>Rhagodia parabolica</i>	0.01	2						
<i>Rhagodia spinescens</i>			0.5	15	0.2	15		
<i>Rytidosperma spp.</i>	0.2	50						
<i>Sclerolaena birchii</i>	0.1	5	0.6	10	0.4	20	0.01	2
<i>Sida hackettiana</i>			0.01	5				
<i>Sida spinosa</i> *	0.3	100	1	250	5	500	0.5	250
<i>Sida spp.</i>			20	1000				
<i>Silybum marianum</i> *					0.01	1		
<i>Sisymbrium irio</i> *			0.7	100			10	500
<i>Sisymbrium officinale</i> *	0.2	50	0.7	100	0.1	9		
<i>Sisymbrium spp.</i> *					0.1	100		
<i>Solanum ferocissimum</i>	0.1	20						
<i>Solanum nigrum</i> *	0.1	6	0.02	8	0.01	10		
<i>Solanum parvifolium subsp. parvifolium</i>	0.3	15	0.01	5				
<i>Sonchus oleraceus</i> *					0.05	10	0.01	10
<i>Stuartina spp.</i>					0.01	10		
<i>Swainsona galegifolia</i>	0.02	3			0.01	1		
<i>Teucrium betchei</i>			0.01	1	0.1	1	0.01	1
<i>Teucrium junceum</i>	0.02	3						
<i>Vittadinia cervicalis</i>	0.2	35						
<i>Vittadinia sulcata</i>			0.3	10	0.01	5		

## Appendix 2: Fauna species at or near the Subject Site:

1. Opportunistic observations (26-8-21) at or within c150m of subject site
2. Mills (2008; appendix 2) (Location of Habitat Surveys by Mills (2008; Figure 4); (red = approx. subject site location ie near his survey sites 3 and 7)



3. AMBS (on-going): Camera trap survey (21/10/20 to 15/6/21 data)
4. Birdlife Australia Birdata (<https://birdata.birdlife.org.au/>) (green annotation = approx. subject site location; red dots are various sample locations of those who submitted data to Birdlife Australia)



5. BioNet Atlas records (10km x 10km) (NSW DPIE, 2021d) (centred on old mine site)(accessed September 2021)

Family	Scientific Name	Common Name	Oportunistic (26/8/21) (#within c150m)	AMBS (2021)	Mills (2008; appendix 2)	BirdData Count	BioNet Records (10kmx10km)	NSW status	Comm. status
<b>Amphibia</b>									
Hylidae	<i>Litoria caerulea</i>	Green Tree Frog					1	P	
Hylidae	<i>Litoria rubella</i>	Desert Tree Frog					1	P	
Limnodynastidae	<i>Limnodynastes tasmaniensis</i>	Spotted Grass Frog			X			P	
<b>Reptilia</b>									
Carphodactylidae	<i>Underwoodisaurus milii</i>	Thick-tailed Gecko			X		1	P	
Diplodactylidae	<i>Strophurus williamsi</i>	Eastern Spiny-tailed Gecko			X		1	P	
Scincidae	<i>Anomalopus leuckartii</i>	Two-clawed Worm-skink			X			P	
Scincidae	<i>Cryptoblepharus virgatus</i>	Cream-striped Shinning-skink			X			P	
Scincidae	<i>Ctenotus robustus</i>	Robust Ctenotus			X			P	
Scincidae	<i>Lampropholis delicata</i>	Dark-flecked Garden Sunskink	1					P	
Agamidae	<i>Pogona barbata</i>	Bearded Dragon			X			P	
Varanidae	<i>Varanus varius</i>	Lace Monitor			X			P	
Pythonidae	<i>Morelia spilota metcalfei</i>	Murray/Darling Carpet Python	#1 <sup>MS</sup>		X			P	
Elapidae	<i>Vermicella annulata</i>	Bandy-bandy					1	P	
<b>Aves</b>									
Anatidae	<i>Anas gracilis</i>	Grey Teal					1	P	
Anatidae	<i>Anas superciliosa</i>	Pacific Black Duck			X	1			
Anatidae	<i>Chenonetta jubata</i>	Australian Wood Duck			X		2	P	
Anatidae	<i>Dendrocygna eytoni</i>	Plumed Whistling-Duck					1	P	
Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian Grebe				1	1	P	

Family	Scientific Name	Common Name	Oportunistic (26/8/21) ("within c150m)	AMBS (2021)	Mills (2008; appendix 2)	BirdData Count	BioNet Records (10kmx10km)	NSW status	Comm. status
Columbidae	<i>Geopelia striata</i>	Peaceful Dove					1	P	
Columbidae	<i>Ocyphaps lophotes</i>	Crested Pigeon			X		1	P	
Columbidae	<i>Phaps chalcoptera</i>	Common Bronzewing					1	P	
Podargidae	<i>Podargus strigoides</i>	Tawny Frogmouth	remains of dead one		X	1		P	
Ardeidae	<i>Ardea pacifica</i>	White-necked Heron			X				
Threskiornithidae	<i>Threskiornis molucca</i>	Australian White Ibis			X		1	P	
Threskiornithidae	<i>Threskiornis spinicollis</i>	Straw-necked Ibis			X				
Accipitridae	<i>Accipiter fasciatus</i>	Brown Goshawk			X				
Accipitridae	<i>Aquila audax</i>	Wedge-tailed Eagle					1	P	
Accipitridae	<i>Elanus axillaris</i>	Black-shouldered Kite			X				
Accipitridae	<i>Haliastur sphenurus</i>	Whistling Kite					1	P	
Accipitridae	<i>Hieraetus morphnoides</i>	Little Eagle			X	1		V,P	
Falconidae	<i>Falco berigora</i>	Brown Falcon			X			P	
Falconidae	<i>Falco cenchroides cenchroides</i>	Nankeen Kestrel	1			2	1	P	
Charadriidae	<i>Vanellus miles</i>	Masked Lapwing				1			
Turnicidae	<i>Turnix varius</i>	Painted Button-quail		X					
Cacatuidae	<i>Cacatua galerita</i>	Sulphur-crested Cockatoo			X		1	P	
Cacatuidae	<i>Cacatua sanguinea</i>	Little Corella			X	1		P	
Cacatuidae	<i>Eolophus roseicapilla</i>	Galah			X	4	2	P	
Psittacidae	<i>Alisterus scapularis</i>	Australian King-Parrot			X		1	P	
Psittacidae	<i>Aprosmictus erythropterus</i>	Red-winged Parrot			X			P	
Psittacidae	<i>Glossopsitta pusilla</i>	Little Lorikeet			X			V,P	
Psittacidae	<i>Glossopsitta concinna</i>	Musk Lorikeet				2		P	
Psittacidae	<i>Platycercus eximius</i>	Eastern Rosella			X	1	1	P	
Psittacidae	<i>Psephotus haematonotus</i>	Red-rumped Parrot			X	1	1	P	
Strigidae	<i>Ninox novaeseelandiae</i>	Southern Boobook		X			1	P	

Family	Scientific Name	Common Name	Oportunistic (26/8/21) (#within c150m)	AMBS (2021)	Mills (2008; appendix 2)	BirdData Count	BioNet Records (10kmx10km)	NSW status	Comm. status
Alcedinidae	<i>Dacelo novaeguineae</i>	Laughing Kookaburra			X			P	
Coraciidae	<i>Eurystomus orientalis</i>	Dollarbird					1	P	
Maluridae	<i>Malurus cyaneus</i>	Superb Fairy-wren			X	3		P	
Acanthizidae	<i>Acanthiza apicalis</i>	Inland Thornbill					1	P	
Acanthizidae	<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill	5		X			P	
Acanthizidae	<i>Acanthiza nana</i>	Yellow Thornbill			X			P	
Acanthizidae	<i>Acanthiza reguloides</i>	Buff-rumped Thornbill			X			P	
Acanthizidae	<i>Acanthiza uropygialis</i>	Chestnut-rumped Thornbill	1		X	1	1	P	
Acanthizidae	<i>Chthonicola sagittata</i>	Speckled Warbler			X		1	V,P	
Acanthizidae	<i>Gerygone olivacea</i>	White-throated Gerygone			X			P	
Acanthizidae	<i>Smicrornis brevirostris</i>	Weebill			X			P	
Pardalotidae	<i>Pardalotus striatus</i>	Striated Pardalote	2		X	1		P	
Meliphagidae	<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater			X			P	
Meliphagidae	<i>Anthochaera carunculata</i>	Red Wattlebird				1		P	
Meliphagidae	<i>Gavicalis virescens</i>	Singing Honeyeater			X	4		P	
Meliphagidae	<i>Manorina melanocephala</i>	Noisy Miner			X	3		P	
Meliphagidae	<i>Philemon corniculatus</i>	Noisy Friarbird			X			P	
Meliphagidae	<i>Ptilotula penicillata</i>	White-plumed Honeyeater			X		1	P	
Pomatostomidae	<i>Pomatostomus temporalis</i>	Grey-crowned Babbler (eastern subspecies)			X	1		V,P	
Campephagidae	<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	1		X		1	P	
Pachycephalidae	<i>Colluricincla harmonica</i>	Grey Shrike-thrush			X			P	

Family	Scientific Name	Common Name	Oportunistic (26/8/21) (#within c150m)	AMBS (2021)	Mills (2008; appendix 2)	BirdData Count	BioNet Records (10kmx10km)	NSW status	Comm. status
Pachycephalidae	<i>Pachycephala pectoralis</i>	Golden Whistler			X			P	
Pachycephalidae	<i>Pachycephala rufiventris</i>	Rufous Whistler	1		X			P	
Artamidae	<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow					1	V,P	
Artamidae	<i>Artamus personatus</i>	Masked Woodswallow				1			
Artamidae	<i>Cracticus nigrogularis</i>	Pied Butcherbird	1		X	3		P	
Artamidae	<i>Cracticus torquatus</i>	Grey Butcherbird			X	2		P	
Artamidae	<i>Gymnorhina tibicen</i>	Australian Magpie	2		X	8		P	
Artamidae	<i>Strepera graculina</i>	Pied Currawong			X		1	P	
Rhipiduridae	<i>Rhipidura albiscapa</i>	Grey Fantail	2		X				
Rhipiduridae	<i>Rhipidura leucophrys</i>	Willie Wagtail			X	1	1	P	
Corvidae	<i>Corvus coronoides</i>	Australian Raven	2		X	3		P	
Corvidae	<i>Corvus mellori</i>	Little Raven				2			
Monarchidae	<i>Grallina cyanoleuca</i>	Magpie-lark			X	4	1	P	
Corcoracidae	<i>Corcorax melanorhamphos</i>	White-winged Chough			X		1	P	
Corcoracidae	<i>Struthidea cinerea</i>	Apostlebird			X	2		P	
Petroicidae	<i>Eopsaltria australis</i>	Eastern Yellow Robin			X			P	
Hirundinidae	<i>Hirundo neoxena</i>	Welcome Swallow			X			P	
Hirundinidae	<i>Petrochelidon ariel</i>	Fairy Martin					1	P	
Sturnidae	<i>Sturnus vulgaris*</i>	Common Starling			X	1	1		
Dicaeidae	<i>Dicaeum hirundinaceum</i>	Mistletoebird			X			X	
Estrildidae	<i>Stizoptera bichenovii</i>	Double-barred Finch			X			P	
Estrildidae	<i>Taeniopygia guttata</i>	Zebra Finch	20					P	
Passeridae	<i>Passer domesticus*</i>	House Sparrow			X			P	

Family	Scientific Name	Common Name	Oportunistic (26/8/21) (#within c150m)	AMBS (ongoing)	Mills (2008; appendix 2)	BirdData Count	BioNet Records (10kmx10km)	NSW status	Comm. status
<b>Mammalia</b>									
Tachyglossidae	<i>Tachyglossus aculeatus</i>	Short-beaked Echidna	scat		X		4	P	
Dasyuridae	<i>Antechinus flavipes</i>	Yellow-footed Antechinus		X	X				
Dasyuridae	<i>Dasyurus maculatus</i>	Spotted-tailed Quoll					1	V,P	E
Phascolarctidae	<i>Phascolarctos cinereus</i>	Koala			X		35	V,P	V
Phalangeridae	<i>Trichosurus vulpecula</i>	Common brushtail possum		X	X				
Phalangeridae	<i>Trichosurus sp.</i>	brushtail possum					1	P	
Macropodidae	<i>Macropus giganteus</i>	Eastern Grey Kangaroo	3		X				
Macropodidae	<i>Macropus sp.</i>	kangaroo / wallaby					1	P	
Macropodidae	<i>Osphranter robustus</i>	Common Wallaroo	#2 (♀)		X				
Macropodidae	<i>Wallabia bicolor</i>	Swamp Wallaby			X			P	
Muridae	<i>Mus musculus*</i>	House Mouse		X					
Muridae	<i>Rattus rattus*</i>	Black Rat	Scats (probably this spp.?)	X					
Canidae	<i>Vulpes vulpes*</i>	Fox			X		6		
Leporidae	<i>Lepus capensis occidentalis</i>	European Hare			X				
Leporidae	<i>Oryctolagus cuniculus*</i>	Rabbit			X				
Cervidae	<i>Cervus sp.*</i>	Unidentified Deer					1		
Bovidae	<i>Bos taurus*</i>	Domestic Cattle			X				

## **Appendix 3: BioNet Atlas Threatened Species records in Gunnedah LGA (NSW DPIE, 2021e) and the Likelihood of Occurrence on Subject Site**

Scientific Name	Common Name	NSW status	Comm. status	Records	Likelihood of Occurrence on Subject Site
<i>Uvidicolus sphyrurus</i>	Border Thick-tailed Gecko	V,P	V	7	Possible, in rocky habitat (see NSW EES, 2021) in area approved but not to be disturbed (SSBO, 0000) with the proposal
<i>Aprasia parapulchella</i>	Pink-tailed Legless Lizard	V,P	V	1	Unlikely: Not suitable macrohabitat as described for species near Gunnedah (Wong <i>et al</i> , 2011; pg 934-935) however there is rocky habitat in area approved but not to be disturbed (SSBP, 0000) with the proposal.
<i>Hoplocephalus bitorquatus</i>	Pale-headed Snake	V,P		1	Unlikely: Not suitable habitat (see Fitzgerald <i>et al</i> , 2010)
<i>Leipoa ocellata</i>	Malleefowl	E1,P	V	1	Unlikely: Not suitable habitat (see Marchant & Higgins, 1993)
<i>Oxyura australis</i>	Blue-billed Duck	V,P		1	Unlikely: No suitable habitat (see Marchant & Higgins, 1990)
<i>Stictonetta naevosa</i>	Freckled Duck	V,P		1	Unlikely: No suitable habitat (see Marchant & Higgins, 1990)
<i>Circus assimilis</i>	Spotted Harrier	V,P		6	Possible foraging habitat, not particularly suitable nesting habitat (see Marchant & Higgins, 1993)
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	V,P		2	Unlikely: No suitable habitat (see Marchant & Higgins, 1990)
^^ <i>Hamirostra melanosternon</i>	Black-breasted Buzzard	V,P,3		1	Possible foraging habitat, not suitable nesting habitat (see Marchant & Higgins, 1993)
<i>Hieraaetus morphnoides</i>	Little Eagle	V,P		13	Known near subject site; assessment undertaken
^^ <i>Lophoictinia isura</i>	Square-tailed Kite	V,P,3		5	Possible foraging habitat, not suitable nesting habitat (see Marchant & Higgins, 1993)
^ <i>Falco hypoleucos</i>	Grey Falcon	E1,P,2		2	Possible foraging habitat, not suitable nesting habitat (see Marchant & Higgins, 1993)
<i>Falco subniger</i>	Black Falcon	V,P		9	Possible foraging habitat, not suitable nesting habitat (see Marchant & Higgins, 1993)
<i>Grus rubicunda</i>	Brolga	V,P		1	Unlikely: No suitable habitat (see Marchant & Higgins, 1993)
<i>Burhinus grallarius</i>	Bush Stone-curlew	E1,P		2	Possible habitat (see Marchant & Higgins, 1993)
^ <i>Calyptorhynchus lathami</i>	Glossy Black-Cockatoo	V,P,2		12	Unlikely: No suitable foraging ( <i>Allocasuarina</i> spp.) or breeding habitat (large hollows) (see Higgins, 1999)
<i>Glossopsitta pusilla</i>	Little Lorikeet	V,P		55	Known near subject site; assessment undertaken
^^ <i>Lathamus discolor</i>	Swift Parrot	E1,P,3	CE	4	Unlikely: No suitable foraging substrate; mostly <i>Eucalyptus</i> nectar but includes insects such as lerps on foliage of <i>Eucalyptus</i> species (see Higgins, 1999)
^^ <i>Neophema pulchella</i>	Turquoise Parrot	V,P,3		63	Possible foraging habitat, not suitable nesting habitat (see Higgins, 1999)
^^ <i>Ninox connivens</i>	Barking Owl	V,P,3		12	Possible low quality hunting habitat, not suitable nesting habitat (see Higgins, 1999)

Scientific Name	Common Name	NSW status	Comm. status	Records	Likelihood of Occurrence on Subject Site
<i>Ninox strenua</i>	Powerful Owl	V,P,3		3	Possible low quality hunting habitat, not suitable nesting habitat (see Higgins, 1999)
<i>Tyto novaehollandiae</i>	Masked Owl	V,P,3		8	Possible low quality hunting habitat, not suitable nesting habitat (see Higgins, 1999)
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	V,P		71	Possible foraging habitat, not suitable nesting habitat (see Higgins et al, 2001)
<i>Chthonicola sagittata</i>	Speckled Warbler	V,P		156	Known near subject site; assessment undertaken
<i>Anthochaera phrygia</i>	Regent Honeyeater	E4A,P	CE	1	Unlikely: No Myrtaceae trees for nectar or lerps (See Higgins et al, 2001)
<i>Epthianura albifrons</i>	White-fronted Chat	V,P		2	Unlikely: No suitable habitat (see Higgins et al, 2001)
<i>Grantiella picta</i>	Painted Honeyeater	V,P	V	1	Possible with few mistletoe plants available for diet (see Higgins et al, 2001)
<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater (eastern subspecies)	V,P		2	Unlikely: No suitable habitat (see Higgins et al, 2001)
<i>Pomatostomus temporalis temporalis</i>	Grey-crowned Babbler (eastern subspecies)	V,P		125	Known near subject site; assessment undertaken
<i>Daphoenositta chrysoptera</i>	Varied Sittella	V,P		22	Possible foraging and nesting habitat (see Higgins & Peter, 2002)
<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	V,P		32	Known near subject site; assessment undertaken
<i>Melanodryas cucullata cucullata</i>	Hooded Robin (south-eastern form)	V,P		31	Possible foraging and nesting habitat (see Higgins & Peter, 2002)
<i>Petroica phoenicea</i>	Flame Robin	V,P		2	Possible non-breeding season habitat (see Higgins & Peter, 2002)
<i>Stagonopleura guttata</i>	Diamond Firetail	V,P		17	Possible foraging areas and nesting habitat (see Higgins et al, 2006)
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	V,P	E	12	Known near subject site; assessment undertaken
<i>Phascolarctos cinereus</i>	Koala	V,P	V	1518	Known near subject site; assessment undertaken
<i>Cercartetus nanus</i>	Eastern Pygmy-possum	V,P		2	Unlikely: Not suitable habitat (see Tulloch, 2006)
<i>Petaurus norfolcensis</i>	Squirrel Glider	V,P		13	Unlikely: Not suitable habitat (See Goldingay & Jackson, 2004)
<i>Macropus dorsalis</i>	Black-striped Wallaby	E1,P		3	Unlikely: Unsuitable habitat e.g. sparse open understorey (see Johnson, 2008)
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V,P	V	6	Unlikely: Not suitable habitat (see Eby, 1995; ABS, 2001)
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	V,P		65	Possible foraging habitat, no roosting/breeding habitat (see Churchill, 2008)
<i>Micronomus norfolkensis</i>	Eastern Coastal Free-tailed Bat	V,P		1	Possible foraging habitat, no roosting/breeding habitat (see Churchill, 2008)
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V,P	V	11	Possible foraging habitat, no roosting/breeding habitat (see Churchill, 2008)
<i>Chalinolobus nigrogriseus</i>	Hoary Wattled Bat	V,P		1	Possible foraging habitat, no roosting/breeding habitat (see Churchill, 2008)
<i>Chalinolobus picatus</i>	Little Pied Bat	V,P		7	Possible foraging habitat, no roosting/breeding habitat (see Churchill, 2008)

Scientific Name	Common Name	NSW status	Comm. status	Records	Likelihood of Occurrence on Subject Site
<i>Nyctophilus corbeni</i>	Corben's Long-eared Bat	V,P	V	10	Possible foraging habitat, no roosting/breeding habitat (Law et al, 2018)
<i>Vespadelus troughtoni</i>	Eastern Cave Bat	V,P		46	Possible foraging habitat, no roosting/breeding habitat (see Churchill, 2008)
<i>Miniopterus oriana oceanensis</i>	Large Bent-winged Bat	V,P		3	Possible foraging habitat, no roosting/breeding habitat (see Churchill, 2008)
<i>Pseudomys pilligaensis</i>	Pilliga Mouse	V,P	V	4	Unlikely: Unsuitable habitat e.g. too rocky (see Tokushima & Jarman, 2015)

## **Appendix 4: BioNet Atlas records for all Fauna in Gunnedah LGA**

Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Copyright the State of NSW through the Department of Planning, Industry and Environment. Search criteria : Public Report of all Valid Records of Entities in GUNNEDAH LGA returned a total of 48,742 records of 2,074 species (NB: Includes flora not listed in appendix)

Report generated on 1/09/2021 4:39 PM

Family	Scientific Name	Common Name	NSW status	Comm. status	Records
<b>Amphibia</b>					
Myobatrachidae	<i>Crinia parinsignifera</i>	Eastern Sign-bearing Froglet	P		1
Myobatrachidae	<i>Crinia signifera</i>	Common Eastern Froglet	P		4
Myobatrachidae	<i>Crinia sloanei</i>	Sloane's Froglet	V,P	E	P
Myobatrachidae	<i>Pseudophryne bibronii</i>	Bibron's Toadlet	P		3
Myobatrachidae	<i>Uperoleia laevis</i>	Smooth Toadlet	P		1
Myobatrachidae	<i>Uperoleia rugosa</i>	Wrinkled Toadlet	P		4
Hylidae	<i>Cyclorana alboguttata</i>	Striped Burrowing Frog	P		2
Hylidae	<i>Cyclorana platycephala</i>	Water-holding Frog	P		1
Hylidae	<i>Cyclorana verrucosa</i>	Rough Frog	P		5
Hylidae	<i>Litoria booroolongensis</i>	Booroolong Frog	E1,P	E	K
Hylidae	<i>Litoria caerulea</i>	Green Tree Frog	P		38
Hylidae	<i>Litoria daviesae</i>	Davies' Tree Frog	V,P		K
Hylidae	<i>Litoria latopalmata</i>	Broad-palmed Frog	P		23
Hylidae	<i>Litoria peronii</i>	Peron's Tree Frog	P		38
Hylidae	<i>Litoria rubella</i>	Desert Tree Frog	P		20
Limnodynastidae	<i>Adelotus brevis</i>	Tusked Frog population in the Nandewar and New England Tableland Bioregions	E2,P		P
Limnodynastidae	<i>Limnodynastes dumerilii</i>	Eastern Banjo Frog	P		10
Limnodynastidae	<i>Limnodynastes fletcheri</i>	Long-thumbed Frog	P		10
Limnodynastidae	<i>Limnodynastes interioris</i>	Giant Banjo Frog	P		1
Limnodynastidae	<i>Limnodynastes salmini</i>	Salmon Striped Frog	P		5
Limnodynastidae	<i>Limnodynastes tasmaniensis</i>	Spotted Grass Frog	P		19
Limnodynastidae	<i>Limnodynastes terraereginae</i>	Northern Banjo Frog	P		6
Limnodynastidae	<i>Neobatrachus sudellae</i>	Sudell's Frog	P		15
Limnodynastidae	<i>Notaden bennettii</i>	Crucifix Frog	P		1
Limnodynastidae	<i>Platyplectrum ornatum</i>	Ornate Burrowing Frog	P		7
<b>Reptilia</b>					
Chelidae	<i>Chelodina expansa</i>	Broad-shelled Turtle	P		3
Chelidae	<i>Chelodina longicollis</i>	Eastern Snake-necked Turtle	P		22
Chelidae	<i>Emydura macquarii</i>	Macquarie Turtle	P		3
Chelidae	<i>Myuchelys bellii</i>	Western Sawshelled Turtle, Bell's Turtle	E1,P	V	P
Carphodactylidae	<i>Underwoodisaurus milii</i>	Thick-tailed Gecko	P		46
Carphodactylidae	<i>Uvidicolus sphyurus</i>	Border Thick-tailed Gecko	V,P	V	7
Diplodactylidae	<i>Diplodactylus vittatus</i>	Wood Gecko	P		2
Diplodactylidae	<i>Nebulifera robusta</i>	Robust Velvet Gecko	P		31
Diplodactylidae	<i>Strophurus intermedius</i>	Southern Spiny-tailed Gecko	P		1
Diplodactylidae	<i>Strophurus williamsi</i>	Eastern Spiny-tailed Gecko	P		18
Gekkonidae	<i>Gehyra dubia</i>	Dubious Dtella	P		47
Gekkonidae	<i>Gehyra sp.</i>	Unidentified Dtella	P		4
Gekkonidae	<i>Gehyra variegata</i>	Tree Dtella	P		28
Gekkonidae	<i>Heteronotia binoei</i>	Bynoe's Gecko	P		19

Family	Scientific Name	Common Name	NSW status	Comm. status	Records
Pygopodidae	<i>Aprasia parapulchella</i>	Pink-tailed Legless Lizard	V,P	V	1
Pygopodidae	<i>Delma inornata</i>	Patternless Delma	P		1
Pygopodidae	<i>Delma plebeia</i>	Leaden Delma	P		3
Pygopodidae	<i>Delma tincta</i>	Excitable Delma	P		2
Pygopodidae	<i>Lialis burtonis</i>	Burton's Snake-lizard	P		1
Pygopodidae	<i>Pygopus schraderi</i>	Eastern Hooded Scaly-foot	P		2
Scincidae	<i>Anomalopus leuckartii</i>	Two-clawed Worm-skink	P		21
Scincidae	<i>Carlia tetradactyla</i>	Southern Rainbow-skink	P		1
Scincidae	<i>Carlia vivax</i>	Tussock Rainbow-skink	P		3
Scincidae	<i>Concinnia tenuis</i>	Barred-sided Skink	P		2
Scincidae	<i>Cryptoblepharus australis</i>	Inland Snake-eyed Skink	P		3
Scincidae	<i>Cryptoblepharus pulcher</i>	Elegant Snake-eyed Skink	P		24
Scincidae	<i>Cryptoblepharus sp.</i>		P		4
Scincidae	<i>Cryptoblepharus virgatus</i>	Cream-striped Shinning-skink	P		19
Scincidae	<i>Ctenotus allotropis</i>	Brown-blazed Wedgesnout Ctenotus	P		3
Scincidae	<i>Ctenotus robustus</i>	Robust Ctenotus	P		50
Scincidae	<i>Ctenotus sp.</i>		P		2
Scincidae	<i>Ctenotus taeniolatus</i>	Copper-tailed Skink	P		5
Scincidae	<i>Egernia striolata</i>	Tree Skink	P		147
Scincidae	<i>Eulamprus quoyii</i>	Eastern Water-skink	P		1
Scincidae	<i>Lampropholis delicata</i>	Dark-flecked Garden Sunskink	P		5
Scincidae	<i>Lampropholis guichenoti</i>	Pale-flecked Garden Sunskink	P		2
Scincidae	<i>Lerista bougainvillii</i>	South-eastern Slider	P		3
Scincidae	<i>Lerista muelleri</i>	Wood Mulch-slider	P		2
Scincidae	<i>Lerista punctatovittata</i>	Eastern Robust Slider	P		2
Scincidae	<i>Liopholis modesta</i>	Eastern Ranges Rock-skink	P		2
Scincidae	<i>Liopholis whitii</i>	White's Skink	P		K
Scincidae	<i>Lygisaurus foliorum</i>	Tree-base Litter-skink	P		29
Scincidae	<i>Menetia greyii</i>	Common Dwarf Skink	P		6
Scincidae	<i>Morethia boulengeri</i>	South-eastern Morethia Skink	P		62
Scincidae	<i>Tiliqua scincoides</i>	Eastern Blue-tongue	P		19
Agamidae	<i>Amphibolurus burnsi</i>	Burns' Dragon	P		6
Agamidae	<i>Amphibolurus muricatus</i>	Jacky Lizard	P		9
Agamidae	<i>Diporiphora australis</i>	Tommy Roundhead	P		1
Agamidae	<i>Diporiphora nobbi</i>	Nobbi Dragon	P		20
Agamidae	<i>Intellagama lesueurii</i>	Eastern Water Dragon	P		1
Agamidae	<i>Pogona barbata</i>	Bearded Dragon	P		37
Agamidae	<i>Tympanocryptis tetraporophora</i>	Eyrean Earless Dragon	P		1
Varanidae	<i>Varanus gouldii</i>	Gould's Goanna	P		3
Varanidae	<i>Varanus varius</i>	Lace Monitor	P		95

Family	Scientific Name	Common Name	NSW status	Comm. status	Records
Typhlopidae	<i>Anilius proximus</i>	Proximus Blind Snake	P		3
Typhlopidae	<i>Anilius sp.</i>	blind snake	P		1
Typhlopidae	<i>Anilius wiedii</i>	Brown-snouted Blind Snake	P		1
Pythonidae	<i>Morelia spilota metcalfei</i>	Murray/Darling Carpet Python	P		1
Elapidae	<i>Brachyurophis australis</i>	Coral Snake	P		3
Elapidae	<i>Demansia psammophis</i>	Yellow-faced Whip Snake	P		6
Elapidae	<i>Furina diadema</i>	Red-naped Snake	P		10
Elapidae	<i>Hoplocephalus bitorquatus</i>	Pale-headed Snake	V,P		1
Elapidae	<i>Notechis scutatus</i>	Tiger Snake	P		1
Elapidae	<i>Pseudechis australis</i>	King Brown Snake	P		1
Elapidae	<i>Pseudechis guttatus</i>	Spotted Black Snake	P		9
Elapidae	<i>Pseudechis porphyriacus</i>	Red-bellied Black Snake	P		4
Elapidae	<i>Pseudechis sp.</i>	Unidentified Black Snake	P		4
Elapidae	<i>Pseudonaja textilis</i>	Eastern Brown Snake	P		18
Elapidae	<i>Suta dwyeri</i>	Dwyer's Snake	P		1
Elapidae	<i>Suta suta</i>	Curl Snake	P		1
Elapidae	<i>Vermicella annulata</i>	Bandy-bandy	P		6
<b>Aves</b>					
Casuariidae	<i>Dromaius novaehollandiae</i>	Emu	P		9
Megapodiidae	<i>Alectura lathamii</i>	Australian Brush-turkey population in the Nandewar and Brigalow Belt South Bioregions	E2,P		K
Megapodiidae	<i>Leipoa ocellata</i>	Malleefowl	E1,P	V	1
Phasianidae	<i>Coturnix pectoralis</i>	Stubble Quail	P		16
Phasianidae	<i>Synoicus ypsilophora</i>	Brown Quail	P		14
Anseranatidae	<i>Anseranas semipalmata</i>	Magpie Goose	V,P		K
Anatidae	<i>Anas castanea</i>	Chestnut Teal	P		2
Anatidae	<i>Anas gracilis</i>	Grey Teal	P		26
Anatidae	<i>Anas superciliosa</i>	Pacific Black Duck	P		35
Anatidae	<i>Aythya australis</i>	Hardhead	P		2
Anatidae	<i>Chenonetta jubata</i>	Australian Wood Duck	P		50
Anatidae	<i>Cygnus atratus</i>	Black Swan	P		4
Anatidae	<i>Dendrocygna arcuata</i>	Wandering Whistling-Duck	P		1
Anatidae	<i>Dendrocygna eytoni</i>	Plumed Whistling-Duck	P		3
Anatidae	<i>Malacorhynchus membranaceus</i>	Pink-eared Duck	P		3
Anatidae	<i>Oxyura australis</i>	Blue-billed Duck	V,P		1
Anatidae	<i>Stictonetta naevosa</i>	Freckled Duck	V,P		1
Podicipedidae	<i>Podiceps cristatus</i>	Great Crested Grebe	P		3
Podicipedidae	<i>Poliiocephalus poliocephalus</i>	Hoary-headed Grebe	P		2
Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian Grebe	P		18
Columbidae	<i>Columba livia*</i>	Rock Dove			8
Columbidae	<i>Geopelia cuneata</i>	Diamond Dove	P		2
Columbidae	<i>Geopelia humeralis</i>	Bar-shouldered Dove	P		46

Family	Scientific Name	Common Name	NSW status	Comm. status	Records
Columbidae	<i>Geopelia striata</i>	Peaceful Dove	P		76
Columbidae	<i>Ocyphaps lophotes</i>	Crested Pigeon	P		115
Columbidae	<i>Phaps chalcoptera</i>	Common Bronzewing	P		90
Columbidae	<i>Spilopelia chinensis*</i>	Spotted Turtle-Dove			1
Podargidae	<i>Podargus strigoides</i>	Tawny Frogmouth	P		86
Caprimulgidae	<i>Eurostopodus argus</i>	Spotted Nightjar	P		2
Caprimulgidae	<i>Eurostopodus mystacalis</i>	White-throated Nightjar	P		10
Aegothelidae	<i>Aegotheles cristatus</i>	Australian Owlet-nightjar	P		158
Apodidae	<i>Apus pacificus</i>	Fork-tailed Swift	P	C,J,K	5
Apodidae	<i>Hirundapus caudacutus</i>	White-throated Needletail	P	V,C,J,K	9
Anhingidae	<i>Anhinga novaehollandiae</i>	Australasian Darter	P		10
Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	Little Pied Cormorant	P		11
Phalacrocoracidae	<i>Phalacrocorax carbo</i>	Great Cormorant	P		2
Phalacrocoracidae	<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant	P		7
Phalacrocoracidae	<i>Phalacrocorax varius</i>	Pied Cormorant	P		5
Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian Pelican	P		7
Ciconiidae	<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork	E1,P		K
Ardeidae	<i>Ardea intermedia</i>	Intermediate Egret	P		1
Ardeidae	<i>Ardea pacifica</i>	White-necked Heron	P		13
Ardeidae	<i>Botaurus poiciloptilus</i>	Australasian Bittern	E1,P	E	K
Ardeidae	<i>Casmerodius modesta</i>	Eastern Great Egret	P		2
Ardeidae	<i>Egretta novaehollandiae</i>	White-faced Heron	P		26
Ardeidae	<i>Nycticorax caledonicus</i>	Nankeen Night Heron	P		7
Threskiornithidae	<i>Platalea flavipes</i>	Yellow-billed Spoonbill	P		14
Threskiornithidae	<i>Platalea regia</i>	Royal Spoonbill	P		2
Threskiornithidae	<i>Plegadis falcinellus</i>	Glossy Ibis	P		1
Threskiornithidae	<i>Threskiornis moluccus</i>	Australian White Ibis	P		3
Threskiornithidae	<i>Threskiornis spinicollis</i>	Straw-necked Ibis	P		20
Accipitridae	<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk	P		1
Accipitridae	<i>Accipiter fasciatus</i>	Brown Goshawk	P		15
Accipitridae	<i>Aquila audax</i>	Wedge-tailed Eagle	P		70
Accipitridae	<i>Aviceda subcristata</i>	Pacific Baza	P		3
Accipitridae	<i>Circus approximans</i>	Swamp Harrier	P		1
Accipitridae	<i>Circus assimilis</i>	Spotted Harrier	V,P		6
Accipitridae	<i>Elanus axillaris</i>	Black-shouldered Kite	P		24
Accipitridae	<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	V,P		2
Accipitridae	<i>Haliastur sphenurus</i>	Whistling Kite	P		18
Accipitridae	<i>Hamirostra melanosternon</i>	Black-breasted Buzzard	V,P,3		1
Accipitridae	<i>Hieraaetus morphnoides</i>	Little Eagle	V,P		13
Accipitridae	<i>Lophoictinia isura</i>	Square-tailed Kite	V,P,3		5
Accipitridae	<i>Milvus migrans</i>	Black Kite	P		6
Accipitridae	<i>Pandion cristatus</i>	Eastern Osprey	V,P,3		K

Family	Scientific Name	Common Name	NSW status	Comm. status	Records
Falconidae	<i>Falco berigora</i>	Brown Falcon	P		25
Falconidae	<i>Falco cenchroides cenchroides</i>	Nankeen Kestrel	P		75
Falconidae	<sup>^</sup> <i>Falco hypoleucos</i>	Grey Falcon	E1,P,2		2
Falconidae	<i>Falco longipennis</i>	Australian Hobby	P		22
Falconidae	<i>Falco peregrinus</i>	Peregrine Falcon	P		7
Falconidae	<i>Falco subniger</i>	Black Falcon	V,P		9
Gruidae	<i>Grus rubicunda</i>	Brolga	V,P		1
Rallidae	<i>Fulica atra</i>	Eurasian Coot	P		3
Rallidae	<i>Gallinula tenebrosa</i>	Dusky Moorhen	P		3
Otididae	<i>Ardeotis australis</i>	Australian Bustard	E1,P		K
Burhinidae	<i>Burhinus grallarius</i>	Bush Stone-curlew	E1,P		2
Recurvirostridae	<i>Himantopus himantopus</i>	Black-winged Stilt	P		3
Recurvirostridae	<i>Recurvirostra novaehollandiae</i>	Red-necked Avocet	P		2
Charadriidae	<i>Euseyornis melanops</i>	Black-fronted Dotterel	P		5
Charadriidae	<i>Vanellus miles</i>	Masked Lapwing	P		25
Charadriidae	<i>Vanellus miles novaehollandiae</i>	[Spur-winged Plover]	P		1
Charadriidae	<i>Vanellus tricolor</i>	Banded Lapwing	P		2
Jacaniidae	<i>Irediparra gallinacea</i>	Comb-crested Jacana	V,P		K
Rostratulidae	<i>Rostratula australis</i>	Australian Painted Snipe	E1,P	E	K
Scolopacidae	<i>Gallinago hardwickii</i>	Latham's Snipe	P	J,K	2
Scolopacidae	<i>Limosa limosa</i>	Black-tailed Godwit	V,P	C,J,K	P
Scolopacidae	<i>Tringa nebularia</i>	Common Greenshank	P	C,J,K	1
Turnicidae	<i>Turnix varius</i>	Painted Button-quail	P		19
Turnicidae	<i>Turnix velox</i>	Little Button-quail	P		3
Laridae	<i>Chlidonias hybrida</i>	Whiskered Tern	P		2
Laridae	<i>Chroicocephalus novaehollandiae</i>	Silver Gull	P		4
Laridae	<i>Hydroprogne caspia</i>	Caspian Tern	P	J	2
Cacatuidae	<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	P		139
Cacatuidae	<i>Cacatua sanguinea</i>	Little Corella	P		35
Cacatuidae	<sup>^^</sup> <i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	V,P,3		K
Cacatuidae	<sup>^</sup> <i>Calyptorhynchus lathami</i>	Glossy Black-Cockatoo	V,P,2		12
Cacatuidae	<i>Eolophus roseicapilla</i>	Galah	P		219
Cacatuidae	<sup>^</sup> <i>Lophochroa leadbeateri</i>	Major Mitchell's Cockatoo	V,P,2		K
Cacatuidae	<i>Nymphicus hollandicus</i>	Cockatiel	P		33
Psittacidae	<i>Alisterus scapularis</i>	Australian King-Parrot	P		61
Psittacidae	<i>Aprosmictus erythropterus</i>	Red-winged Parrot	P		48
Psittacidae	<i>Barnardius zonarius</i>	Australian Ringneck	P		17
Psittacidae	<i>Barnardius zonarius barnardi</i>	[Mallee Ringneck]	P		19
Psittacidae	<i>Glossopsitta concinna</i>	Musk Lorikeet	P		51
Psittacidae	<i>Glossopsitta pusilla</i>	Little Lorikeet	V,P		55
Psittacidae	<sup>^^</sup> <i>Lathamus discolor</i>	Swift Parrot	E1,P,3	CE	4

Family	Scientific Name	Common Name	NSW status	Comm. status	Records
Psittacidae	<i>Neophema pulchella</i>	Turquoise Parrot	V,P,3		63
Psittacidae	<i>Northiella haematogaster</i>	Blue Bonnet	P		18
Psittacidae	<i>Platycercus elegans</i>	Crimson Rosella	P		15
Psittacidae	<i>Platycercus eximius</i>	Eastern Rosella	P		168
Psittacidae	<i>Platycercus sp.</i>	Unidentified Rosella	P		7
Psittacidae	<i>Polytelis swainsonii</i>	Superb Parrot	V,P,3	V	K
Psittacidae	<i>Psephotus haematonotus</i>	Red-rumped Parrot	P		74
Psittacidae	<i>Psephotus varius</i>	Mulga Parrot	P		1
Psittacidae	<i>Trichoglossus haematodus</i>	Rainbow Lorikeet	P		8
Cuculidae	<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo	P		27
Cuculidae	<i>Chalcites basalis</i>	Horsfield's Bronze-Cuckoo	P		12
Cuculidae	<i>Chalcites lucidus</i>	Shining Bronze-Cuckoo	P		12
Cuculidae	<i>Chalcites osculans</i>	Black-eared Cuckoo	P		15
Cuculidae	<i>Eudynamys orientalis</i>	Eastern Koel	P		14
Cuculidae	<i>Heteroscenes pallidus</i>	Pallid Cuckoo	P		16
Cuculidae	<i>Scythrops novaehollandiae</i>	Channel-billed Cuckoo	P		20
Strigidae	<i>Ninox connivens</i>	Barking Owl	V,P,3		12
Strigidae	<i>Ninox novaeseelandiae</i>	Southern Boobook	P		69
Strigidae	<i>Ninox strenua</i>	Powerful Owl	V,P,3		3
Tytonidae	<i>Tyto javanica</i>	Eastern Barn Owl	P		28
Tytonidae	<i>Tyto novaehollandiae</i>	Masked Owl	V,P,3		8
Tytonidae	<i>Tyto tenebricosa</i>	Sooty Owl	V,P,3		K
Alcedinidae	<i>Ceyx azureus</i>	Azure Kingfisher	P		2
Alcedinidae	<i>Dacelo novaeguineae</i>	Laughing Kookaburra	P		90
Alcedinidae	<i>Todiramphus pyrrhopygius</i>	Red-backed Kingfisher	P		4
Alcedinidae	<i>Todiramphus sanctus</i>	Sacred Kingfisher	P		24
Meropidae	<i>Merops ornatus</i>	Rainbow Bee-eater	P		30
Coraciidae	<i>Eurystomus orientalis</i>	Dollarbird	P		10
Climacteridae	<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	V,P		71
Climacteridae	<i>Cormobates leucophaea</i>	White-throated Treecreeper	P		135
Maluridae	<i>Malurus cyaneus</i>	Superb Fairy-wren	P		118
Maluridae	<i>Malurus lamberti</i>	Variiegated Fairy-wren	P		39
Maluridae	<i>Malurus leucopterus</i>	White-winged Fairy-wren	P		12
Maluridae	<i>Malurus sp.</i>	Unidentified Fairy-wren	P		1
Acanthizidae	<i>Acanthiza apicalis</i>	Inland Thornbill	P		47
Acanthizidae	<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill	P		84
Acanthizidae	<i>Acanthiza lineata</i>	Striated Thornbill	P		8
Acanthizidae	<i>Acanthiza nana</i>	Yellow Thornbill	P		94
Acanthizidae	<i>Acanthiza pusilla</i>	Brown Thornbill	P		19
Acanthizidae	<i>Acanthiza reguloides</i>	Buff-rumped Thornbill	P		52
Acanthizidae	<i>Acanthiza uropygialis</i>	Chestnut-rumped Thornbill	P		13
Acanthizidae	<i>Aphelocephala leucopsis</i>	Southern Whiteface	P		6
Acanthizidae	<i>Chthonicola sagittata</i>	Speckled Warbler	V,P		156

Family	Scientific Name	Common Name	NSW status	Comm. status	Records
Acanthizidae	<i>Gerygone fusca</i>	Western Gerygone	P		53
Acanthizidae	<i>Gerygone olivacea</i>	White-throated Gerygone	P		23
Acanthizidae	<i>Hylacola pyrrhopygia</i>	Chestnut-rumped Heathwren	P		1
Acanthizidae	<i>Sericornis frontalis</i>	White-browed Scrubwren	P		26
Acanthizidae	<i>Smicronis brevirostris</i>	Weebill	P		122
Pardalotidae	<i>Pardalotus punctatus</i>	Spotted Pardalote	P		45
Pardalotidae	<i>Pardalotus striatus</i>	Striated Pardalote	P		156
Meliphagidae	<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater	P		142
Meliphagidae	<i>Acanthorhynchus tenuirostris</i>	Eastern Spinebill	P		7
Meliphagidae	<i>Anthochaera carunculata</i>	Red Wattlebird	P		24
Meliphagidae	<i>Anthochaera chrysoptera</i>	Little Wattlebird	P		1
Meliphagidae	<i>Anthochaera phrygia</i>	Regent Honeyeater	E4A,P	CE	1
Meliphagidae	<i>Anthochaera sp.</i>	Unidentified Wattlebird	P		1
Meliphagidae	<i>Caligavis chrysoptera</i>	Yellow-faced Honeyeater	P		87
Meliphagidae	<i>Certhionyx variegatus</i>	Pied Honeyeater	V,P		P
Meliphagidae	<i>Entomyzon cyanotis</i>	Blue-faced Honeyeater	P		16
Meliphagidae	<i>Epthianura albifrons</i>	White-fronted Chat	V,P		2
Meliphagidae	<i>Epthianura tricolor</i>	Crimson Chat	P		1
Meliphagidae	<i>Gavicalis virescens</i>	Singing Honeyeater	P		26
Meliphagidae	<i>Grantiella picta</i>	Painted Honeyeater	V,P	V	1
Meliphagidae	<i>Lichenostomus melanops</i>	Yellow-tufted Honeyeater	P		4
Meliphagidae	<i>Lichmera indistincta</i>	Brown Honeyeater	P		16
Meliphagidae	<i>Manorina flavigula</i>	Yellow-throated Miner	P		8
Meliphagidae	<i>Manorina melanocephala</i>	Noisy Miner	P		163
Meliphagidae	<i>Meliphaga lewinii</i>	Lewin's Honeyeater	P		3
Meliphagidae	<i>Melithreptus brevirostris</i>	Brown-headed Honeyeater	P		31
Meliphagidae	<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater (eastern subspecies)	V,P		2
Meliphagidae	<i>Melithreptus lunatus</i>	White-naped Honeyeater	P		8
Meliphagidae	<i>Myzomela sanguinolenta</i>	Scarlet Honeyeater	P		11
Meliphagidae	<i>Nesoptilotis leucotis</i>	White-eared Honeyeater	P		58
Meliphagidae	<i>Philemon citreogularis</i>	Little Friarbird	P		40
Meliphagidae	<i>Philemon corniculatus</i>	Noisy Friarbird	P		140
Meliphagidae	<i>Plectorhyncha lanceolata</i>	Striped Honeyeater	P		101
Meliphagidae	<i>Ptilotula fusca</i>	Fuscous Honeyeater	P		18
Meliphagidae	<i>Ptilotula penicillata</i>	White-plumed Honeyeater	P		108
Pomatostomidae	<i>Pomatostomus superciliosus</i>	White-browed Babbler	P		2
Pomatostomidae	<i>Pomatostomus temporalis temporalis</i>	Grey-crowned Babbler (eastern subspecies)	V,P		125
Falconidae	<i>Falcunculus frontatus frontatus</i>	Eastern Shrike-tit	P		8
Neosittidae	<i>Daphoenositta chrysoptera</i>	Varied Sittella	V,P		22
Campephagidae	<i>Coracina maxima</i>	Ground Cuckoo-shrike	P		7

Family	Scientific Name	Common Name	NSW status	Comm. status	Records
Campephagidae	<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	P		78
Campephagidae	<i>Coracina papuensis</i>	White-bellied Cuckoo-shrike	P		9
Campephagidae	<i>Edolisoma tenuirostris</i>	Cicadabird	P		17
Campephagidae	<i>Lalage sueurii</i>	White-winged Triller	P		50
Oreoicidae	<i>Oreoica gutturalis</i>	Crested Bellbird	P		1
Pachycephalidae	<i>Colluricincla harmonica</i>	Grey Shrike-thrush	P		116
Pachycephalidae	<i>Pachycephala inornata</i>	Gilbert's Whistler	V,P		K
Pachycephalidae	<i>Pachycephala olivacea</i>	Olive Whistler	V,P		P
Pachycephalidae	<i>Pachycephala pectoralis</i>	Golden Whistler	P		35
Pachycephalidae	<i>Pachycephala rufiventris</i>	Rufous Whistler	P		150
Oriolidae	<i>Oriolus sagittatus</i>	Olive-backed Oriole	P		25
Artamidae	<i>Artamus cinereus</i>	Black-faced Woodswallow	P		3
Artamidae	<i>Artamus cyanopterus</i>	Dusky Woodswallow	V,P		32
Artamidae	<i>Artamus leucorhynchus</i>	White-breasted Woodswallow	P		1
Artamidae	<i>Artamus personatus</i>	Masked Woodswallow	P		6
Artamidae	<i>Artamus superciliosus</i>	White-browed Woodswallow	P		29
Artamidae	<i>Cracticus nigrogularis</i>	Pied Butcherbird	P		114
Artamidae	<i>Cracticus sp.</i>	Unidentified Butcherbird	P		2
Artamidae	<i>Cracticus torquatus</i>	Grey Butcherbird	P		114
Artamidae	<i>Gymnorhina tibicen</i>	Australian Magpie	P		205
Artamidae	<i>Strepera graculina</i>	Pied Currawong	P		137
Rhipiduridae	<i>Rhipidura albiscapa</i>	Grey Fantail	P		103
Rhipiduridae	<i>Rhipidura leucophrys</i>	Willie Wagtail	P		147
Rhipiduridae	<i>Rhipidura rufifrons</i>	Rufous Fantail	P		1
Corvidae	<i>Corvus bennetti</i>	Little Crow	P		1
Corvidae	<i>Corvus coronoides</i>	Australian Raven	P		155
Corvidae	<i>Corvus mellori</i>	Little Raven	P		6
Corvidae	<i>Corvus orru</i>	Torresian Crow	P		8
Monarchidae	<i>Grallina cyanoleuca</i>	Magpie-lark	P		111
Monarchidae	<i>Myiagra cyanoleuca</i>	Satin Flycatcher	P		1
Monarchidae	<i>Myiagra inquieta</i>	Restless Flycatcher	P		17
Monarchidae	<i>Myiagra rubecula</i>	Leaden Flycatcher	P		32
Corcoracidae	<i>Corcorax melanorhamphos</i>	White-winged Cough	P		60
Corcoracidae	<i>Struthidea cinerea</i>	Apostlebird	P		79
Petroicidae	<i>Eopsaltria australis</i>	Eastern Yellow Robin	P		138
Petroicidae	<i>Melanodryas cucullata</i>	Hooded Robin (south-eastern form)	V,P		31
Petroicidae	<i>Microeca fascinans</i>	Jacky Winter	P		55
Petroicidae	<i>Petroica boodang</i>	Scarlet Robin	V,P		K
Petroicidae	<i>Petroica goodenovii</i>	Red-capped Robin	P		19
Petroicidae	<i>Petroica phoenicea</i>	Flame Robin	V,P		2
Alaudidae	<i>Mirafra javanica</i>	Horsfield's Bushlark	P		11

Family	Scientific Name	Common Name	NSW status	Comm. status	Records
Cisticolidae	<i>Cisticola exilis</i>	Golden-headed Cisticola	P		7
Artamidae	<i>Gymnorhina tibicen</i>	Australian Magpie	P		205
Artamidae	<i>Strepera graculina</i>	Pied Currawong	P		137
Rhipiduridae	<i>Rhipidura albiscapa</i>	Grey Fantail	P		103
Rhipiduridae	<i>Rhipidura leucophrys</i>	Willie Wagtail	P		147
Rhipiduridae	<i>Rhipidura rufifrons</i>	Rufous Fantail	P		1
Corvidae	<i>Corvus bennetti</i>	Little Crow	P		1
Corvidae	<i>Corvus coronoides</i>	Australian Raven	P		155
Corvidae	<i>Corvus mellori</i>	Little Raven	P		6
Corvidae	<i>Corvus orru</i>	Torresian Crow	P		8
Monarchidae	<i>Grallina cyanoleuca</i>	Magpie-lark	P		111
Monarchidae	<i>Myiagra cyanoleuca</i>	Satin Flycatcher	P		1
Monarchidae	<i>Myiagra inquieta</i>	Restless Flycatcher	P		17
Monarchidae	<i>Myiagra rubecula</i>	Leaden Flycatcher	P		32
Corcoracidae	<i>Corcorax melanorhamphos</i>	White-winged Cough	P		60
Corcoracidae	<i>Struthidea cinerea</i>	Apostlebird	P		79
Petroicidae	<i>Eopsaltria australis</i>	Eastern Yellow Robin	P		138
Petroicidae	<i>Melanodryas cucullata</i>	Hooded Robin (south-eastern form)	V,P		31
Petroicidae	<i>Microeca fascians</i>	Jacky Winter	P		55
Petroicidae	<i>Petroica boodang</i>	Scarlet Robin	V,P		K
Petroicidae	<i>Petroica goodenovii</i>	Red-capped Robin	P		19
Petroicidae	<i>Petroica phoenicea</i>	Flame Robin	V,P		2
Alaudidae	<i>Mirafra javanica</i>	Horsfield's Bushlark	P		11
Cisticolidae	<i>Cisticola exilis</i>	Golden-headed Cisticola	P		7
Locustellidae	<i>Cincloramphus cruralis</i>	Brown Songlark	P		5
Locustellidae	<i>Cincloramphus mathewsi</i>	Rufous Songlark	P		29
Hirundinidae	<i>Cheramoeca leucosterna</i>	White-backed Swallow	P		5
Hirundinidae	<i>Hirundo neoxena</i>	Welcome Swallow	P		34
Hirundinidae	<i>Petrochelidon ariel</i>	Fairy Martin	P		12
Hirundinidae	<i>Petrochelidon nigricans</i>	Tree Martin	P		18
Turdidae	<i>Turdus merula*</i>	Eurasian Blackbird			1
Sturnidae	<i>Acridotheres tristis*</i>	Common Myna			20
Sturnidae	<i>Sturnus vulgaris*</i>	Common Starling			69
Zosteropidae	<i>Zosterops lateralis</i>	Silvereye	P		57
Dicaeidae	<i>Dicaeum hirundinaceum</i>	Mistletoebird	P		99
Estrildidae	<i>Neochmia modesta</i>	Plum-headed Finch	P		3
Estrildidae	<i>Neochmia temporalis</i>	Red-browed Finch	P		15
Estrildidae	<i>Stagonopleura guttata</i>	Diamond Firetail	V,P		17
Estrildidae	<i>Stizoptera bichenovii</i>	Double-barred Finch	P		64
Estrildidae	<i>Taeniopygia guttata</i>	Zebra Finch	P		12
Passeridae	<i>Passer domesticus*</i>	House Sparrow			9
Motacillidae	<i>Anthus novaeseelandiae</i>	Australian Pipit	P		19

Family	Scientific Name	Common Name	NSW status	Comm. status	Records
<b>Mammalia</b>					
Ornithorhynchidae	<i>Ornithorhynchus anatinus</i>	Platypus	P		11
Tachyglossidae	<i>Tachyglossus aculeatus</i>	Short-beaked Echidna	P		223
Dasyuridae	<i>Antechinus flavipes</i>	Yellow-footed Antechinus	P		114
Dasyuridae	<i>Antechinus sp.</i>	Unidentified Antechinus	P		2
Dasyuridae	<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	V,P	E	12
Dasyuridae	<i>Phascogale tapoatafa</i>	Brush-tailed Phascogale	V,P		P
Dasyuridae	<i>Sminthopsis macroura</i>	Stripe-faced Dunnart	V,P		P
Dasyuridae	<i>Sminthopsis murina</i>	Common Dunnart	P		21
Dasyuridae	<i>Sminthopsis sp.</i>	Dunnart	P		2
Phascolarctidae	<i>Phascolarctos cinereus</i>	Koala	V,P	V	1518
Vombatidae	<i>Vombatus ursinus</i>	Bare-nosed Wombat	P		11
Burramyidae	<i>Cercartetus nanus</i>	Eastern Pygmy-possum	V,P		2
Petauridae	<i>Petaurus australis</i>	Yellow-bellied Glider	V,P		K
Petauridae	<i>Petaurus breviceps</i>	Sugar Glider	P		16
Petauridae	<i>Petaurus norfolcensis</i>	Squirrel Glider	V,P		13
Pseudocheiridae	<i>Petauroides volans</i>	Greater Glider	P	V	K
Pseudocheiridae	<i>Pseudocheirus peregrinus</i>	Common Ringtail Possum	P		15
Acrobatidae	<i>Acrobates pygmaeus</i>	Feathertail Glider	P		1
Phalangeridae	<i>Trichosurus sp.</i>	brushtail possum	P		92
Phalangeridae	<i>Trichosurus vulpecula</i>	Common Brushtail Possum	P		318
Potoroidae	<i>Aepyprymnus rufescens</i>	Rufous Bettong	V,P		K
Macropodidae	<i>Macropod sp.</i>	unidentified macropod	P		9
Macropodidae	<i>Macropus dorsalis</i>	Black-striped Wallaby	E1,P		3
Macropodidae	<i>Macropus giganteus</i>	Eastern Grey Kangaroo	P		180
Macropodidae	<i>Macropus sp.</i>	kangaroo / wallaby	P		101
Macropodidae	<i>Notamacropus rufogriseus</i>	Red-necked Wallaby	P		39
Macropodidae	<i>Osphranter robustus</i>	Common Wallaroo	P		133
Macropodidae	<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	E1,P	V	K
Macropodidae	<i>Wallabia bicolor</i>	Swamp Wallaby	P		91
Pteropodidae	<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V,P	V	6
Pteropodidae	<i>Pteropus scapulatus</i>	Little Red Flying-fox	P		4
Pteropodidae	<i>Pteropus sp.</i>	Flying-fox	P		10
Rhinolophidae	<i>Rhinolophus megaphyllus</i>	Eastern Horseshoe-bat	P		5
Emballonuridae	<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheathtail-bat	V,P		65
Molossidae	<i>Austronomus australis</i>	White-striped Freetail-bat	P		74
Molossidae	<i>Micronomus norfolkensis</i>	Eastern Coastal Free-tailed Bat	V,P		1
Molossidae	<i>Mormopterus "Species 4" (big penis)</i>		P		26
Molossidae	<i>Mormopterus petersi</i>	Inland Free-tailed Bat	P		19
Molossidae	<i>Mormopterus planiceps</i>	Little Mastiff-bat	P		46
Molossidae	<i>Mormopterus sp.</i>	mastiff-bat	P		5
Molossidae	<i>Ozimops ridei</i>	Eastern Free-tailed Bat	P		21
Vespertilionidae	<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V,P	V	11

Family	Scientific Name	Common Name	NSW status	Comm. status	Records
Vespertilionidae	<i>Chalinolobus gouldii</i>	Gould's Wattled Bat	P		121
Vespertilionidae	<i>Chalinolobus morio</i>	Chocolate Wattled Bat	P		78
Vespertilionidae	<i>Chalinolobus nigrogriseus</i>	Hoary Wattled Bat	V,P		1
Vespertilionidae	<i>Chalinolobus picatus</i>	Little Pied Bat	V,P		7
Vespertilionidae	<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	V,P		K
Vespertilionidae	<i>Nyctophilus corbeni</i>	Corben's Long-eared Bat	V,P	V	10
Vespertilionidae	<i>Nyctophilus geoffroyi</i>	Lesser Long-eared Bat	P		203
Vespertilionidae	<i>Nyctophilus gouldi</i>	Gould's Long-eared Bat	P		53
Vespertilionidae	<i>Nyctophilus sp.</i>	long-eared bat	P		39
Vespertilionidae	<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	V,P		K
Vespertilionidae	<i>Scotorepens balstoni</i>	Inland Broad-nosed Bat	P		75
Vespertilionidae	<i>Scotorepens greyii</i>	Little Broad-nosed Bat	P		60
Vespertilionidae	<i>Scotorepens orion</i>	Eastern Broad-nosed Bat	P		4
Vespertilionidae	<i>Scotorepens sp.</i>	Unidentified broad-nosed bat	P		27
Vespertilionidae	<i>Vespadelus darlingtoni</i>	Large Forest Bat	P		5
Vespertilionidae	<i>Vespadelus sp.</i>	Unidentified Eptesicus	P		1
Vespertilionidae	<i>Vespadelus trougtoni</i>	Eastern Cave Bat	V,P		46
Vespertilionidae	<i>Vespadelus vulturnus</i>	Little Forest Bat	P		253
Miniopteridae	<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	V,P		3
Muridae	<i>Hydromys chrysogaster</i>	Water-rat	P		1
Muridae	<i>Mus musculus*</i>	House Mouse			46
Muridae	<i>Pseudomys pilligaensis</i>	Pilliga Mouse	V,P	V	4
Muridae	<i>Rattus fuscipes</i>	Bush Rat	P		2
Muridae	<i>Rattus rattus*</i>	Black Rat			17
Muridae	<i>Rattus sp.*</i>	rat	P		3
Canidae	<i>Canis familiaris*</i>	Dog			1
Canidae	<i>Canis lupus*</i>	Dingo, domestic dog			15
Canidae	<i>Vulpes vulpes*</i>	Fox			402
Felidae	<i>Felis catus*</i>	Cat			38
Leporidae	<i>Lepus capensis occidentalis</i>	European Hare			43
Leporidae	<i>Oryctolagus cuniculus*</i>	Rabbit			40
Equidae	<i>Equus caballus*</i>	Horse			2
Suidae	<i>Sus scrofa*</i>	Pig			43
Bovidae	<i>Bos taurus*</i>	European cattle			27
Bovidae	<i>Capra hircus*</i>	Goat			85
Bovidae	<i>Ovis aries*</i>	Sheep (feral)			20
Cervidae	<i>Cervus sp.*</i>	Unidentified Deer			31
Cervidae	<i>Dama dama*</i>	Fallow Deer			3

Family	Scientific Name	Common Name	NSW status	Comm. status	Records
<b>Invertebrates</b>					
Araneidae	<i>Eriophora transmarina</i>	Garden orb-weaver,			1
Lycosidae	<i>Lycosa godeffroyi</i>	Garden wolf spider			1
Theridiidae	<i>Latrodectus hasseltii</i>	redback spider			2
Lycaenidae	<i>Lucia Limbaria</i>	Grassland Copper			1
Nymphalidae	<i>Vanessa kershawi</i>	Australian painted lady			2
Pieridae	<i>Eurema hecabe hecabe</i>	common grass yellow			1
Unknown Fauna	<i>Microchiroptera suborder</i>	Unidentified Microbat			9

## **Appendix 5: Assessment of Habitat Suitability of Potential Threatened Avifauna at the Subject Site**

Species	BCA	EPBC	Macrohabitat	Nest & Roosting Habitat	Diet	Likelihood on subject site & proposal impacts
Spotted Harrier <i>Circus assimilis</i>	V,P		Open & wooded habitat, stronghold arid, semi-arid Aust. Hunt mainly river flat undulating country with low vegetation cover; woodlands open enough so low flight not obstructed & ground vegetation accessible; prefer grassland (natural or formed by clearing), crop stubble; herbfields, saltbush & bluebush <sup>3</sup>	Nest in trees in open or remnant woodlands; in agricultural areas, often near ripening crops. Nest site on horizontal branch, often in dense outer foliage or dense regrowth from broken branch, on top of mistletoe; rarely on ground; in Acacia, Callitris, Casuarina & Eucalyptus <sup>3</sup>	General vertebrate diet, taking ground birds (quail, button-quail, songlarks, pipits), mice rats, rabbits when available, some places lizards <sup>3</sup>	PCT147 is too dense foraging habitat though Exotic grass and forb land might be suitable. Prey ( <i>Rattus</i> sp) sign was in PCT147 (SSBP0000) to be retained but too dense for foraging. There is no suitable breeding habitat on site. This cannot be considered core habitat for this species and the removal of the small area will not affect any population of this species. There is still extensive more suitable habitat nearby
Black-breasted Buzzard ^^ <i>Hamirostra melanosternon</i>	V,P,3		Open wooded lands & open country, mainly in nth Aust.; mainly arid, semi-arid Aust. Throughout range prefer -tree-lined watercourses, billabongs & ephemeral lakes & open floodplain woodlands. Dense vegetation of all kinds avoided <sup>3</sup>	Nest in dead, or partly dead trees; in inlands usually beside watercourses <sup>3</sup>	Hunt over open country at 10-20m sometimes lower. Mostly rabbits when available, also large lizards, small to medium sized birds especially passerines raptors, parrots, nestling birds, eggs of ground nesting birds & carrion <sup>3</sup>	PCT147 is too dense foraging habitat though Exotic grass and forb land might be suitable. There is no suitable breeding habitat on site. This cannot be considered core habitat for this species and the removal of the small area will not affect any population of this species. There is still extensive more suitable habitat nearby
Little Eagle <i>Hieraetus morphnoides</i>	V		Over wooded & forested lands & open country; particularly where mosaic of timbered and open areas; wooded farmland, gallery forests, wooded floodplains along watercourses & wetlands <sup>3</sup>	Moderate sized platform/open bowl of twigs, small branches; lined with green leaves, usually Eucalyptus. Nest site (5-30m, up to 45m) in high fork or horizontal branch usually live trees, occasionally in mistletoe; occasionally dead trees. Sites open woodland, mallee, tree-lined watercourses, occasionally in pine plantation. Nocturnal roosting, in, live trees near horizontal branches inside tree canopy <sup>3</sup>	Mammals (prefers rabbits), birds, reptiles, occasionally large invertebrates & carrion <sup>4</sup>	This cannot be considered core habitat for this species and the removal of the small area with a few non-Eucalyptus trees will not affect any Little Eagle individual or pairs. There is no suitable breeding habitat on site. There is still extensive more suitable habitat nearby.

Species	BCA	EPBC	Macrohabitat	Nest & Roosting Habitat	Diet	Likelihood on subject site & proposal impacts
Square-tailed Kite <i>Lophoictinia isura</i>	V,P,3		Mainly open forests, woodlands particularly fertile soils & abundant passerines; range into open habitats nearby but not extensive treeless regions; absent alpine regions & small, isolated remnants. Predominantly eucalypt open forest/woodlands; early regrowth (0-4yrs) after logging; forest of eucalypts, <i>Angophora</i> , <i>Callitris</i> with shrubby understorey and box-ironbark woodland <sup>3</sup>	Nests in mature living trees, often near water (c100m) but not necessarily near water in coastal forests; in flat or hilly country, gullies. Nest surrounded or nearby forest or woodlands, probably at least some hundreds of hectares on size. Nest placed in fork or large limb, usually horizontal of Eucalypts, <i>Angophora</i> or <i>Melaleuca</i> <sup>3</sup>	Mostly passerines & foliage insects, sometimes just above and through the canopy. Characterised tree top harrier soaring slowly just above and through the canopy <sup>3</sup>	The treed habitat of PCT147 is habitat utilised by passerines and by default, potential food source for this raptor. This cannot be considered core habitat for this species and the removal of the small area will not affect any individual or population of this species. There is still extensive more suitable habitat nearby with suitable for passerines. There is no suitable breeding habitat on site.
Grey Falcon <i>Falco hypoleucos</i>	E1,P,2		Open country and wooded lands in arid & semi-arid zones (mean annual rainfall <500mm). Mainly sandy & stony plain of inland drainage systems, lightly timbered with Acacia scrub & crossed by Eucalypt-lined watercourses; hunt over open areas (e.g. spinifex or bluebush), Also near swamps, bores, waterholes where surface water attracts prey <sup>3</sup>	Mainly breed in arid zone (<250mm mean annual rainfall); nests in tall trees, usually Eucalypts near or beside watercourses. Search for prey on wing or from exposed perched <sup>3</sup>	Mostly birds, particularly granivorous parrots & pigeons with some records of small mammals, insects & reptiles <sup>3</sup>	Prey items have been recorded in or near subject area (appendix 2). This cannot be considered core habitat for this species and the removal of the small area will not affect any individual or population of this species. There is still extensive more suitable habitat nearby with suitable for prey. There is no suitable breeding habitat on site.
Black Falcon <i>Falco subniger</i>	V,P		Mainly over open plains & undulating land with tracts of low vegetation (grasslands, pasture crops, herbfields, saltbush, bluebush plains, saltmarsh). Also in forest, woodland and wooded farmlands but only if open for very open; often associated with wetlands, rivers, creeks, dams, irrigation channels, flooded rive fields especially in arid zone where water attracts prey <sup>3</sup>	Nests in trees, mainly those along watercourses and waterholes on lightly timbered plains. In fork of large trees living or dead; also, on bushes inland; isolated trees or trees fringing creeks, waterholes <sup>3</sup>	Mostly small birds, particularly terrestrial species, also mammals, reptiles & insects <sup>3</sup>	Prey items have been recorded in or near subject area (appendix 2). This cannot be considered core habitat for this species and the removal of the small area will not affect any individual or population of this species. There is still extensive more suitable habitat nearby with suitable for prey. There is no suitable breeding habitat on site.

Species	BCA	EPBC	Macrohabitat	Nest & Roosting Habitat	Diet	Likelihood on subject site & proposal impacts
Bush Stone-curlew <i>Burhinus grallarius</i>	E1,P		Lightly timbered open forest & woodlands; partially cleared farmland with woodland remnants, groundcover short sparse grass few or no shrubs; groundlayer may be carpeted with dry leaves & often with fallen timber. Often associated with Casuarina woodlands but also <i>Eucalypts</i> , <i>Acacia</i> ; also dry open grassland (natural or sown) usually near cover; avoid rainforest & heavy forest though may roost at edge with open country; occasionally mangroves & saltmarsh <sup>3</sup>	Nests on ground, often under trees of open woodland with understorey of short, mown, sparse or lush grass often dead fallen timber <sup>3</sup> Roost on ground among leaf litter, often among clumps or thickets of trees in or adjacent to more open habitat (e.g. savanna, occasionally saltmarsh, swamp or mangroves) <sup>3</sup>	Mainly molluscs centipede, crustaceans, siders, frogs, lizards & snakes, insects, but also vegetation & seeds. Forage in dry open ground, sometimes with woodlands trees, among grass, pasture or crops, sometimes vacant blocks close to settlement <sup>3</sup>	There are few records of this species in Gunnedah LGA and it is mostly unlikely this species would utilise the habitat at the subject site.  There is still extensive more suitable habitat nearby with suitable for this species. The removal of the small area of habitat will not affect any individual or population of this species
Little Lorikeet <i>Glossopsitta pusilla</i>	V		Mainly dry open sclerophyll forest & woodlands dominated by <i>Eucalyptus</i> , less often <i>Angophora</i> or <i>Melaleuca</i> , often near waterbodies <sup>1</sup>	Nests in hollows, including knotholes; in limbs or main trunk, small entrance. Preference for hollows in smooth barked <i>Eucalyptus</i> , or rough barked trunks with smooth bark <sup>2</sup>	Mainly pollen & nectar of <i>Eucalyptus</i> & <i>Melaleuca</i> ; fruits & berries (e.g. mistletoe) <sup>1</sup>	Not suitable habitat for foraging or breeding
Turquoise Parrot <i>Neophema pulchella</i>	V,P,3		Great Divide foothills, rocky ridges, gullies, rolling hills & valleys, river flats & sometimes nearby plains. Eucalypt woodlands & open forests with grass and sometime low understorey shrubs in groundlayer. Usually native grassy forests & woodlands of mixed assemblages of <i>Eucalyptus</i> & <i>Callitris</i> . In farmland prefers ecotone forest & pasture or other grasslands. <sup>1</sup>	Nests in hollow-bearing trees either dead or alive; also tree-stump hollows, fallen logs or fence posts. Preference to breed in open grassy forests/woodlands, in gullies & on lower foothills, which are moist or seasonally waterlogged. Also breed in in ecotone between farmland & forest, rarely breeds in either forest or pasture rarely occurs more than 1km from forest edge. <sup>1</sup>	Seed of grasses, herbaceous plants & shrubs, also flowers nectar, fruits, leaves & scale insects. Feed on or near ground, among seeding grasses or weeds, usually growing beneath trees; in Eucalypt forest feed among grassy groundcover beneath trees or in clearings. Also, near forest edge in cleared farmland but farer from forest in unimproved pasture. <sup>1</sup>	Not suitable habitat for breeding. Possible foraging habitat (Zone 1B, Zone 2) including known plant food sources <sup>1</sup> However, there is still extensive more suitable habitat nearby with suitable for this species. The removal of the small area of habitat will not affect any individual or population of this species

Species	BCA	EPBC	Macrohabitat	Nest & Roosting Habitat	Diet	Likelihood on subject site & proposal impacts
Barking Owl <i>Ninox connivens</i>	V,P,3		Dry sclerophyll forest-woodland often dominated by <i>Eucalyptus</i> & containing many large trees suitable for roosting & breeding & foothills. Includes remnant patches of forest/woodlands or clumps of trees in partly cleared areas such as farmland; also denser riparian or gallery communities near rivers, creeks & lakes. <sup>1</sup>	Usually roost in large densely foliated trees among foliage or on bare branches beneath canopy shaded by foliage. Often near watercourses may use mid-storey shrubs (e.g. <i>Acacia stenophylla</i> , <i>A. salicina</i> thickets) or other shady trees ( <i>Ficus</i> spp; <i>Geijera parviflora</i> ). Breeds in hollows in large trees mainly Eucalypts in woodlands-open forest usually bear watercourses or wetlands <sup>1</sup>	Forage opportunistically on terrestrial, arboreal or aerial prey & mostly foraging among woodland trees or clearings. Carnivorous and insectivorous, taking mainly insects outside breeding season and more birds & mammals when breeding <sup>1</sup>	No suitable nesting habitat & less than optimal roosting habitat. Possible foraging opportunities with insects and birds; it has been known to hunt rats ( <i>Rattus</i> spp) <sup>1</sup> whose sign were noted in Zone 1 (SSBP0000) approved for disturbance but not required. There is still extensive more suitable habitat nearby with suitable for this species. The removal of the small area of habitat will not affect any individual or population of this species
Powerful Owl ^^ <i>Ninox strenua</i>	V,P,3		Often in tall & open wet , mainly in sheltered gullies containing old growth forest with dense understorey & often near permanent streams forest. Also dry sclerophyll forest-woodlands such as those dominated by box-ironbark, <i>Eucalyptus rubida</i> , <i>E. obliqua</i> & riparian <i>E camaldulensis</i> ; also open Casuarina & Callitris forests. May require large tracts of forest vut sometime in fragmented habitats e.g. farmland. <sup>1</sup>	Nests in hollows in large trees, usually living Eucalyptus within or below canopy; or in emergent trees & rarely in stags, stumps or broken off trunks. Sometimes in mature tree surrounded by regrowth. Typically vertical hollows such as broken off tree trunks or in horizontal or sloping spouts. Mostly roost in closed forest including rainforest or wet sclerophyll forest & occasionally in open forests-woodlands; often in crown of dense tree foliage <sup>1</sup> .	Carnivorous specialised in taking medium to large sized arboreal mammals, mainly <i>Pseudocheirus peregrinus</i> , <i>Petauroides volans</i> ; also roosting roosting birds & beetles. Mostly take arboreal prey from forest or woodland canopy, also from understorey & less often ground <sup>1</sup>	No suitable nesting habitat & less than optimal roosting habitat. Possible foraging opportunities with insects and birds; it has been known to hunt rats ( <i>Rattus</i> spp) <sup>1</sup> whose sign were noted in Zone 1 (SSBP0000) approved for disturbance but not required. There is still extensive more suitable habitat nearby with suitable for this species. The removal of the small area of habitat will not affect any individual or population of this species
Masked Owl	V,P,3		Inhabits diverse range of wooded habitats that provide tall or dense mature trees with hollows suitable for roosting & nesting. Recorded mostly open forests & woodlands with sparse understorey, adjoining open habitats (e.g cleared, or partially cleared farmland) <sup>1</sup>	Nests in hollows in trunks, & in near-vertical spouts of large trees usually Eucalyptus in living but sometimes dead trees. Often in prominent trees, either isolated or emergent in forest, woodland, treed farmland, remnant patches <sup>1</sup>	Mostly small to medium-sized terrestrial mammals, also some arboreal or scansorial vertebrates <sup>1</sup>	No suitable nesting habitat & less than optimal roosting habitat. Possible foraging opportunities with insects and birds; it has been known to hunt rats ( <i>Rattus</i> spp) <sup>1</sup> whose sign were noted in Zone 1 (SSBP0000) approved for disturbance but not required. There is still extensive more suitable habitat nearby with suitable for this species. The removal of the small area of habitat will not affect any individual or population of this species

Species	BCA	EPBC	Macrohabitat	Nest & Roosting Habitat	Diet	Likelihood on subject site & proposal impacts
Brown Treecreeper (eastern subspecies) <i>Climacteris picumnus victoriae</i>	V,P		Mostly in woodlands dominated by <i>Eucalyptus</i> , especially stringybarks or other rough <i>Eucalyptus</i> ; usually with open grassy understorey, sometimes with one or more shrub layers but not in areas with dense woody shrub layer; absent or low densities in woodland affected by dieback; often in woodlands River Red Gum woodlands bordering wetlands, rivers & lakes, usually with open understorey of <i>Acacias</i> & grasses but sometimes with upper layer of River Sheoak ( <i>Casuarina cunninghamiana</i> ) <sup>7</sup>	Nest in hollows, usually in dead branches or spouts but also in trunks (including hollow tops of trunks or trees, or in hollow trunks entered through holes in trunk side) of living, or often dead trees; usually in Eucalypts but also <i>Acacia</i> , <i>Belah</i> ( <i>Casuarina cristata</i> ) & sometime <i>Wilga</i> ( <i>Geijera parviflora</i> ) <sup>7</sup>	Almost entirely insectivorous, mainly ants & beetles; occasionally take some plant material such as nectar. Terrestrial and arboreal in about equal proportions; forage mainly by gleaning but also by probing <sup>7</sup>	Possible foraging substrate (Zone 1) with rough barked trees (see table 4) and generally open habitats however not preferred Eucalypt woodlands. No suitable nest sites. Though Brown Treecreepers may on occasion foraging in the extant habitat. The loss of a small area will not affect any Brown Treecreepers individuals or flocks. There is still extensive more suitable habitat nearby
Speckled Warbler <i>Chthonicola saggittata</i>	V		Mainly grassy ground layer dry sclerophyll forest-woodlands dominated by Eucalypts often with scattered understory shrubs; often associated with rocky ridge & gullies <sup>6</sup>	Breed in large exclusive territories. Nests well concealed built in small depression in ground, among grass or low shrubs, fallen branches, rocks & leaf litter; often base of saplings, tussocks, shrubs often sheltered by overhanging branches of trees & shrubs. Nests domes with side entrance, sometimes form short tunnel; made of dried grass, barks, moss & other fibres, lined with feathers, fur, downy grass seed or other soft material <sup>6</sup>	Mainly insectivorous but takes seeds & other plant material; mainly forage on ground by gleaning or probing leaf-litter, forage from grass tussocks, fallen timber, low shrubs & trees; occasionally sally <sup>6</sup>	The habitat is dominated by non-Eucalyptus though Speckled Warblers may on occasion foraging in the extant habitat. The loss of a small area will not affect any Speckled Warbler individuals or pairs. There is still extensive more suitable habitat nearby
Painted Honeyeater <i>Grantiella picta</i>	V,P	V	Mostly in dry open woodland/forest; strongly associated with mistletoes (Loranthaceae mostly <i>Amyema</i> spp). Mostly in box-ironbark woodlands-forest of inland foothills of Great Dividing Range with <i>Amyema pendulum</i> and <i>A. miquelii</i> . Sometimes in stands of <i>Acacia</i> dominated stand with mistletoes <sup>7</sup>	Nest in outer foliage of trees especially <i>Eucalyptus</i> and <i>Casuarina</i> , often supporting mistletoe; very occasionally other trees such as <i>Acacia</i> , <i>Callitris</i> and Paperbarks <sup>7</sup>	Mostly fruit of mistletoe, occasionally nectar & invertebrates. Forage in tree canopy especially among flowering and fruiting mistletoe <sup>7</sup>	Mistletoe species are recorded in Zone 1 (appendix 1) but are in low abundance. In SSBP0001 that is proposed for disturbance the mistletoe ( <i>Lysiana subfalcata</i> ) is on one host specimen ( <i>Capparis mitchellii</i> ). The distribution and abundance in the vicinity of the subject site of mistletoe is unknown however it highly unlikely that any local or dispersing Painted Honeyeaters would be dependent on the specimen in PCT147 (SSBP0001). There is only one record of Painted Honeyeaters in the entire Gunnedah LGA

Species	BCA	EPBC	Macrohabitat	Nest & Roosting Habitat	Diet	Likelihood on subject site & proposal impacts
Dusky Woodswallow <i>Artamus cyanopterus cyanopterus</i>	V		Mainly dry, open sclerophyll forest/woodlands dominated by Eucalyptus; often at clearing edges or clearing in forest/woodlands. Typically, open or sparse understorey of saplings & other shrubs; often in areas of open ground & fallen woody debris <sup>5</sup>	Roosts at night but also day, usually communally; includes trees with rough bark, including burnt or dead trees; tree trunk sides. Nest lightly constructed, open shallow, untidy cup of twigs, grass, fibrous rootlets, Casuarina needles. Nest site varies, in shrub or low tree living or dead in horizontal or upright fork of branch, spout, hollow stump or low, behind loose bark or hollow in fence post; exposed or well concealed in foliage <sup>5</sup>	Invertebrates mainly insects, occasionally nectar, fruit & seeds; primarily forage in air by screening or sallying, less often forage at tree and shrub flowers & occasionally forage on ground, trunks & tree branches <sup>5</sup>	The treed habitat components may provide perching habitat at the vegetation edge and access to aerial foraging at that edge. There is no suitable breeding habitat on site. The proposed removal of the trees at the vegetation edge will not be detrimental at all to any Dusky Woodswallow populations that may use the local area as there is still extensive suitable habitat nearby
Grey-crowned Babbler <i>Pomatostomus temporalis temporalis</i>	V		Mainly open forest, woodland, requires open shrub layer with sparse ground cover fallen timber & leaf litter. Rarely recorded in regrowth forest, or large patches of forest or woodland with dense understorey or grassland with few trees <sup>6</sup>	They build brood-nests but also roost-nest that differ slightly in morphology; noted for swapping use of nest types. The site usually top or crown sides on wide variety of plants usually small trees or saplings but also tall shrubs. Nest always supported by horizontal fork, upright branches or forks or by foliage. External nest materials made of sticks, grass, bark, wool & rootlets & lined with soft grass including tufts with roots attached, bark, wool & feathers <sup>6</sup>	Invertebrates mainly insects occasionally seeds; terrestrial & arboreal; forage on ground among leaf-litter & grass, turning over leaves, bark & small stones to expose prey; also forage from bark of low shrubs & trees <sup>6</sup>	It is possible that any local Grey-crowned Babbler individuals or flock may forage for invertebrates through the extant habitat however if so it wouldn't be likely core foraging habitat for this gregarious species. Highly unlikely to be suitable habitat for breeding. The proposed removal of the few trees at the vegetation edge will not be detrimental at all to any Grey-crowned Babbler populations that may use the local area as there is still extensive suitable habitat nearby
Hooded Robin (south-eastern form) <i>Melanodryas cucullata cucullata</i>	V,P		Mainly in lightly timbered habitats, especially woodlands & shrublands dominated by <i>Acacia</i> & <i>Eucalyptus</i> , often in or near clearings; often recorded in areas with dead or fallen timbers providing suitable perches for foraging <sup>6</sup>	Usually in horizontal fork or branch of tree or shrub, often dead branch of living trees but sometimes dead, occasionally on fork of or branch of fallen tree or limb, stump hollow, in epicormic growth from stump, dense shrub centre. <sup>6</sup>	Arthropods, mainly insects occasionally seeds. Hunt arboreal or terrestrial prey, usually pounce from exposed perches onto prey on ground or vegetation <sup>6</sup>	The proposed removal of the few trees at the vegetation edge will not be detrimental at all to any Hooded Robin populations that may use the local area as there is still extensive suitable habitat nearby

Species	BCA	EPBC	Macrohabitat	Nest & Roosting Habitat	Diet	Likelihood on subject site & proposal impacts
Flame Robin <i>Petroica phoenicea</i>	V,P		Breeding season found mainly in upland wet to moist forests & woodlands, usually on slopes & ridges with open understorey & clearings at altitudes up to 1800m asl. Non-breeding habitat more often occurs in open areas at lower altitude (than breeding season) in drier more open habitat, particularly native & exotic grasslands, farmland & dry sclerophyll forests/woodlands. Considerable overlap in habitat use in breeding & non-breeding seasons though frequency of use changes markedly <sup>6</sup>	Nest often in niche or ledge in charred hollow trunk or tree stump; in end of hollow log or spout or in tip of broken trunk' between piece of bark & trunk or tree stump. Also sheltered cavity in creek bank or road cutting; on ground against tree, shrub or grass; or sheltered by projecting stone or under log, occasionally in dense shrub, niche on rocky hill face, rock cleft or top of tree fern <sup>6</sup>	Invertebrates, mainly insects. Forage mostly on ground (mainly cooler months) though also in vegetation & in air; forage by sallying & less often gleaning <sup>6</sup>	Few records in the entire Gunnedah LGA. Not breeding macrohabitat nor suitable nesting habitat. Suitable for foraging invertebrates in non-breeding seasons. The proposed removal of the trees at the vegetation edge will not be detrimental at all to any Flame Robins populations that may use the local area as there is still extensive suitable habitat nearby.
Diamond Firetail <i>Stagonopleura guttata</i>	V,P		Mostly in Eucalypt dominated woodlands, open forests & other lightly timbered habitats such as farmland with remnant trees, or grasslands with scattered trees. Often along vegetated watercourses. Occurs mostly Great Divide foothills & further inland. Typically, open or sparse understorey of shrubs, small trees or regrowth occasional dense; grass groundcover <sup>5</sup>	Nest site usually in fork among foliage of shrub, in crown of saplings or in mistletoe in tall trees, less often in foliage of tall tree, creeper or dead shrub; often in Eucalyptus & prickly shrubs such as <i>Hakea</i> or <i>Acacia</i> . Occasionally nest in stick nests of other species <sup>5</sup>	Granivorous, mostly eat seeds of grasses, occasionally take seeds of other plants & invertebrates or foliage. Mostly forage on ground & sometime forage above ground, perching in food plants or perches with which seed heads can be reached <sup>5</sup>	Foraging habitat for Poaceae grains is potentially available across all sample locations though exotic invasive Buffel Grass, the most common species (cover & abundance) is not a known food source though other exotic grasses are <sup>5</sup> . Though conceptually breeding habitat may occur it would be less than optimal. The proposed removal of the few trees at the vegetation edge will not be detrimental at all to any Diamond Firetail populations that may use the local area as there is still extensive suitable habitat nearby

References

Key	Reference	Key	Reference
1	Higgins (1999)	5	Higgins <i>et al</i> (2006)
2	Courtney & Debus (2006)	6	Higgins & Peter (2002)
3	Marchant & Higgins (1993)	7	Higgins <i>et al</i> (2001)
4	Debus (1998)		

## **Appendix 6: Data collected by BAM method processed to obtain Vegetation Integrity score**

Site										
Attribute	Value									
IBRA Region	Brigalow Belt South									
IBRA Subregion	Liverpool Plains									
Mitchell Landscape	Cubbo Uplands	<i>Southern part of study area in Breeza Hills Sandstone - Shale Slopes</i>								
Native Vegetation	21.9%	<i>Have classed as linear development. Native Vegetation is % of area within 500m of Study Area that is Native Vegetation. Native Veg = 28.9 ha; Assessment Area = 132.1 ha</i>								
plot	pct	area	patchsize	conditionclass	zone	easting	northing	bearing		
	Number		Number							
SSBP0000	147	0.08	82.9	1A	56	224125	6568357	261		
SSBP0001	147	0.09	82.9	1B	56	224158	6568362	82		
SSBP0002	147	0.06	82.9	2B	56	224264	6568373	96		
SSBP0003	147	0.24	82.9	2A	56	224453	6568317	144		

<b>Composit.</b>										
compTree	compShrub	compGrass	compForbs	compFerns	compOther					
Number	Number	Number	Number	Number	Number					
1	10	4	8	0	4					
1	6	4	10	0	4					
1	3	2	15	0	1					
1	4	0	6	0	1					
<b>Structure</b>										
strucTree	strucShrub	strucGrass	strucForbs	strucFerns	strucOther					
20	3.3	2.2	1.7	0	0.41					
15	3.4	1	5.3	0	0.43					
5	0.8	0.2	2.1	0	0.1					
2	3	0	0.3	0	0.1					
<b>Function</b>										
funLargeTrees	funHollowtrees	funLitterCover	funLenFalle nLogs	funTreeSte m5to9	funTreeSte m10to19	funTree Stem20t o29	funTree Stem30t o49	funTree Stem50t o79	funTr eeReg en	funHighThre atExotic
				[0,1]	[0,1]	[0,1]	[0,1]	[0,1]	[0,1]	
1	1	56	43.5	1	1	1	1	0	1	0.0
0	0	74	27.7	1	1	1	0	0	1	20
2	0	9.2	1	1	0	1	1	0	1	35
0	0	11.2	27	1	0	0	0	0	1	50